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Buying A PDU

A Look At How Your Current Needs & Newer Trends Impact What You Purchase

PDUs HAVE EVOLVED into integral components of a modern power distribution infrastructure. Here's what to look for.

Take Inventory Of Your Needs

Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says to do your homework prior to making a PDU purchase. "It is critical that the PDU you select match up with your power consumption needs and server/network equipment."

Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says you need to know how many amps are needed to support your devices. "You also need to know how much power the devices in the rack will draw, being mindful that you have the right voltage and amperage numbers."

Understand The PDU Options

Femrite says there are three types of PDUs. A basic PDU lacks monitoring and remote administration capabilities. A metered PDU adds the ability to track amperage and management software to monitor the aggregate current being drawn on each PDU. Switched PDUs add local and remote control capabilities on a per-outlet level. Redundancy is important, Femrite says. A dual-circuit PDU offers fault tolerance with two power inputs.

Koty says your uptime goals influence the PDU you purchase. "Inexpensive basic rackmount PDUs may distribute power effectively, but they offer little if any understanding or control of the critical energy flow."

Alex North, director of business development at BayTech (800/523-2702; www.baytech.net), says most rack PDUs look similar. "Evaluators need to open up the hood of all PDUs they are considering and use sound engineering-based judgment to evaluate the method of power distribution the manufacturer employed in the strip."

Consider Mounting & Outlets

Gina Dickson, director of infrastructure products at Black Box (877/877-2269; www.blackbox.com), says buyers often forget about mounting. "They purchase a vertical PDU and then realize after it arrives that it doesn't mount into their cabinet. One way to avoid this is to purchase PDUs and cabinets/racks from the same manufacturer."

Koty notes that horizontal PDUs take up rack space normally reserved for equipment. "If you can't reserve horizontal space in the rack for the PDU, consider a vertically mounted PDU."

Make sure PDUs have the correct outlets and outlet counts, says Andy Grav, technical sales engineer at HM Cragg (800/672-7244; www.hmcragg.com). Koty says you also need to know which types of plugs devices use so you buy PDUs with appropriate receptacles.

Think Intelligently

"When thinking about PDUs, think intelligently," says Carrie Higbie, global director of data center solutions and services at Siemon (860/945-4200; www.siemon.com).

The real-time monitoring capabilities of intelligent PDUs help spot and prevent problems, she says. Alarms should identify power and environmental problems and provide the ability to remotely restart or shut down equipment. "The cost delta between basic PDUs and fully featured intelligent PDUs is negligible when compared to cabinet equipment and energy costs," she says.

Today's lights-out data centers are using switched and managed PDUs, Grav says. "Both of these options allow the end users to monitor the data center from a distance while still having control of the equipment," he says.

Account For Growth

Make sure the PDU can handle your needs now and into the future. "If you don't precisely match up the PDU with your power consumption needs, taking into account anticipated growth/increases, you can wind up having a breaker tripped," Femrite says. P

BUYERS' CHECKLIST

Bob Parente, sales engineer at Server Technology (800/835-1515; www.servertech.com), recommends asking these questions when selecting a PDU:

✔ What is the expected maximum power needed to the rack and what voltage can be supplied to the rack?

✔ Does the expected max power include planned power redundancy and growth?

✔ Will each rack be designed for power redundancy with a standard A and B Input feed configuration? What racks are being used (mounting considerations)?

✔ What types of devices are being connected in the rack? Do you know the power factor for the devices within the rack? How many and what types of outlets are required?

KEY TERMS

basic PDUs
The least expensive PDUs; they offer simple power feeds with no extra features.

metered PDUs
Typically provide an illuminated status display measuring the load level, a handy feature when balancing loads.

smart or intelligent PDUs
Any PDU that offers Web-based management, meter power at both the PDU and individual outlet level, and real-time power monitoring.

switched PDUs
Connect to the network and offer the features of metered PDUs and remote on/off control of outlets.

Maintain The Ideal Temperature

Geist Opengate Containment System Uses Sensors, Chimneys & Enclosures To Provide An Intelligent Cooling Solution For Your Data Center

HOW DO YOU SOLVE cooling problems in your data center? Do you invest in portable cooling? Propose having a contractor install additional CRAC units? Rearrange equipment in an attempt to get by?

"Traditionally, cooling problems get addressed with more CRAC units as a band-aid fix, which results in a situation where the data center is vastly overcooled," says Bryce Kleen, product manager at Geist. "It's like adding a window air-conditioning unit to your new house to keep the temperature cool because it gets hot when you leave all of your doors and windows open." This is very expensive, and you can end up wasting precious money and resources.

An intelligent containment solution, such as the Geist Opengate containment system, is the best option to manage data center cooling and airflow without overcooling.

Maximize Performance

Opengate by Geist is designed to maximize the performance of your cooling system by delivering the hottest return air to the CRAC while only requiring a modest level of cold air at the start, Kleen says.

It does so by providing "intelligent containment," he says. This two-step process focuses on containing heat in the back of the cabinet and then exhausting it through a chimney directly to a CRAC unit, ensuring data center equipment stays at the ideal temperature. In fact, IT intake air is stabilized within a few degrees of the supply air temperature at all points in the data center.

The Opengate system includes expertly manufactured chimneys and conversion kits that seal cabinets at the rear and sides and work to channel hot air directly to the hot air return and minimize hot air mixing.

But unlike simple passive chimney systems, Geist's Opengate incorporates smart fans to regulate the internal pressure of the cabinet, Kleen says. The fans speed up or slow down based on the information they receive from pressure and temperature sensors both inside and outside the cabinet.

"It's a process that successfully quarantines all IT exhaust, so data centers can optimize their cooling supply air temperature," he says. "In fact, by containing the hot air and keeping it from mixing with the cold air, data centers can save up to 40% on cooling energy."

Works With Your Existing Setup

Opengate can work with virtually any type of cabinet setup, whether it's a single cabinet or row of cabinets, cabinets that are partially full or ones that have very high densities.

With Geist's vast library of cabinet-specific installation kits, including cabinet tops, door-blocking kits, and mounting hardware, Opengate is available for virtually every new or existing cabinet model or configuration. And Geist design engineers can deliver a custom solution, if needed, ensuring Opengate can be retrofitted to work in any existing data center, Kleen says, regardless of size or the cold air process currently in use.

The Opengate system's capacity automatically scales as loads are added or removed. High-density loads can be combined, and multiple systems can work together to share cabinet loads. If there's a power failure, the Geist cooling unit can continue to operate using power provided by its PDU.

The software included with Opengate automatically monitors and reports environmental conditions, and you can receive automatic email or SNMP notifications of system threshold breaches. The Opengate system provides a real-time airflow consumption measurement at the rack level. Coupled with Geist's Environet DCIM solution, data centers now have a means to accurately sequence CRAC units or scale back cooling horsepower to match the ever-changing heat loads of today's dynamic data centers. P

Opengate by Geist

(800) 432-3219
www.geistglobal.com

An active containment system that focuses on containing heat and expelling heat directly to CRAC units, maintaining the ideal temperature for your data center, regardless of its size or density.

GEIST

Power Troubleshooting & Maintenance, Simplified

Colored Faceplates & Boxes From PDU Cables Help You Easily Identify & Isolate Power Sources

A CLEAN, ORGANIZED data center is a well-run data center. Equipment is likely to be running more efficiently. Cooling and airflow are optimized. And problems are easier to spot and solve.

Colored faceplates and boxes from PDU Cables are the newest evolution in data center organization and troubleshooting. "Use of a color scheme to manage power sources is an industry best practice," says Troy Peterson, vice president of sales and marketing. "PDU Cables has taken that best practice to a new level."

Improve Facility Management

"Colored faceplates and boxes are a natural extension of the use of color in data centers to improve facility management," Peterson says. PDU Cables has offered colored Liquid-Tight Flexible Metal Conduit for awhile. By carrying that color-coding to the boxes and faceplates, PDU Cables has made identifying the equipment's power path even easier.

In a raised-floor environment, for example, when you lift a floor panel, often the only part of the cable readily visible is the faceplate or top of the box. "With colored faceplates and boxes, one quick peek, and you know which of the two power cables mounted next to each other is A and which is B," Peterson says.

In addition, color-coding dual power feeds ensures you are utilizing both A and B power paths to your dual-corded equipment, he says. The use of colored faceplates and boxes makes it easier to identify which power source supplies the receptacles that feed each rack or cabinet. Matching the colored boxes and faceplates to the conduit means your color scheme is carried out from one end of the cable to the other.

All this leads to better organization, improved troubleshooting, and better overall management. In the event you need to shut power down for maintenance or to troubleshoot a problem, you can easily identify and isolate power sources. Or, in the event of a breaker trip on failover or during a restart, color-coding each electrical power path makes isolating power sources easier.

Color Coding

The PDU Cables colored faceplates and boxes are available in 11 standard colors to match PDU Cables' colored conduit, but the colored faceplates and boxes can be used regardless of whether you already use the Liquid-Tight colored conduit.

"We can also produce custom colors to match any particular job requirements you have, including corporate color schemes," Peterson says. Most colors are kept in inventory, so PDU Cables can ship them as quickly as those without colors, he says. "We are producing painted boxes and faceplates every day, so even custom colors can be turned quickly."

PDU Cables uses a multistep process to ensure the colored boxes and faceplates are consistent, durable, and trouble-free. The colors are matched using the Pantone® Matching System Color Chart, so colors are consistent from order to order, day to day, and from year to year. "You can't color-match these colors by simply buying spray paint cans off the shelf at your local hardware store," Peterson says.

Colored faceplates and boxes may seem like a relatively simple solution to a complex problem. But any investment you can make to help improve data center uptime is one worth making. P

PDU Cables Colored Faceplates & Boxes

(866) 631-4238
www.pducables.com

Make it possible to quickly identify and manage power sources for easier maintenance and troubleshooting.

PDU ⠿ Cables™

FEATURED PRODUCT

Document Filters & Enterprise Search

Most People Understand The Concept Of Enterprise Search; Less Understood Are The Document Filters That Underlie Enterprise Search (Including Hit Highlighting, Etc.)

IF YOU LOOKED at a Microsoft Word file in binary format (as a search engine needs to review it), the file structure is so complex as to make it nearly impossible to pick out the text of the document. In fact, MS Word documents include not only body text but also fields, and often even "hidden" meta data. And MS Word documents can have a nested structure, embedding multiple layers of other documents within an MS Word file.

Delving through these levels of complexity requires a programmatic implementation embedding a deep understanding of file structure. That is the job of the document filters.

But document filters are not just a static item; rather, they are a dynamic component. Every update, for example, that Microsoft makes to the MS Word format requires a corresponding adjustment to the document filters. And any adjustment to account for file format updates must preserve backward compatibility with existing MS Word files.

One leading supplier of enterprise and developer text search software, dtSearch Corp., has built its own document filters over the span of more than two decades. And the company still has to continually upgrade its document filters to correspond with the release of new data formats.

Document Filters: Not Just For Documents

In addition to MS Word, document filters must support many other data formats as well. All of these formats typically include body text and meta data embedded in a unique binary file structure that is itself subject to evolution.

Continuing with the example of dtSearch, along with MS Word, other MS Office supported file types include: PowerPoint, Excel, Access and OneNote. Additionally, the document filters support PDF, RTF, OpenOffice, HTML, XML, CSV and many other file types, along with compression formats like RAR, ZIP and GZIP/TAR.

Because so much data is now in emails, the dtSearch document filters also support popular email types from MS Outlook, Exchange and Thunderbird, etc. And support extends not only to the email body and meta data, but also to attachments, including nested attachment.

The dtSearch document filters cover not only the text and fields of individual files and emails, but also recursively embedded versions of these files and emails. For example, the dtSearch document filters would support an email with a ZIP attachment that contains an MS Access file with an embedded PowerPoint.

The document filters also support browser-compatible images in nearly all above-mentioned formats. Adding to the example above, the dtSearch document filters would not only support an email with a ZIP attachment that contains an MS Access document with a nested PowerPoint, but also an image inside the nested PowerPoint.

The dtSearch Engine APIs can also work with database data like SQL-type data. While SQL itself is not technically a file format, it can include BLOB data consisting of embedded documents inside the SQL data. The same integrated support requirements for recursively embedded documents, meta data, images and the like apply to this BLOB data.

A Spider built into the dtSearch product line also supports dynamic web data (SharePoint, PHP, ASP.NET, SharePoint, etc.) as well as static web data. And of course, this data can also consist of or embed document data like HTML, PDF, XSL/XML, or even classic Office files, all off which require the document filters. P

COMPANY TO WATCH

ServerMonkey Helps Businesses Save Money

Buying Or Selling, Businesses Save By Repurposing Electronics

MORE COMPANIES are discovering they can satisfy their computing technology needs, protect the environment, and save money at the same time by purchasing refurbished equipment. But selecting the right vendor is critical, as companies must ensure the equipment they are buying has been serviced properly and will fill their needs.

ServerMonkey is a Houston, Texas-based technology vendor that is committed to helping companies get a better return on their technology investment. ServerMonkey buys used equipment and then upgrades it to the specifications of new buyers, making sure along the way that each product goes through a full regimen of evaluation and diagnostic procedures. While configure-to-order (CTO) refurbished servers are their specialty, the company also sells a wide range of other types of refurbished tech products and components.

"The number of options that are available for each CTO server system, whether it be a server or workstation, are almost innumerable," says Abram Flansburg, ServerMonkey's supply chain manager. "Customers can order any combination of processor, memory, hard drive, or even small peripheral components like network adapters. If an option is not available on our website, customers can always call us directly to request further customization."

Once the entire system is customized, configured, and put together, ServerMonkey performs a full burn-in test, which can be tailored to a specific industry or use case to make sure the product will perform as expected immediately after implementation. When testing is complete, the company will ship the system in well-secured packaging to prevent damage from occurring during delivery.

ROI For Environment & Your Company

The benefits of buying refurbished equipment go beyond keeping products out of landfills and helping the environment – there's a positive effect on a company's bottom line as well. "Refurbished equipment is a much more affordable option for small businesses, particularly non-profits that tend to have smaller budgets for IT expenditures," says Layla Wright, CEO of ServerMonkey. "The customer gets a product that functions to the same specifications as a brand new unit, but at a much lower price point."
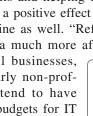
Customers buying refurbished servers get units that are customized to their specifications, and a one-year warranty provides peace of mind. ServerMonkey offers a no-hassle replacement and refund process if a product fails for any reason. Live tech support also is available for customers who need any assistance.

Selling Made Easy

ServerMonkey buys as well as sells used equipment. If you are ready to upgrade and you have equipment you're trying to get rid of, request a Buy Back Quote and you can make money and save landfill space at the same time.

"ServerMonkey wants to partner with companies that care about the full life cycle of the product they produce or use," Wright says. "Finished products should have a robust aftermarket life, so that product is repurposed or recycled with minimum impact on the environment while improving ROI for the original owner and adding value for the secondary owner." P

Most Americans Now Own Smartphones
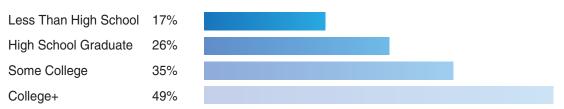
This year is the first that most Americans report having a smartphone as their primary cell phone, according to a survey conducted by the Pew Research Center's Internet & American Life Project. According to the report, 91% of Americans own some kind of cell phone, with 56% owning smartphones and 35% owning some other type of cell phone. Here is how the statistics have changed since 2011:

Device Type: ■ Smartphone ■ Other Cell Phone ■ No Cell Phone

	May 2011	February 2012	May 2013
Smartphone	35%	46%	56%
Other Cell Phone	48%	41%	35%
No Cell Phone	17%	12%	9%
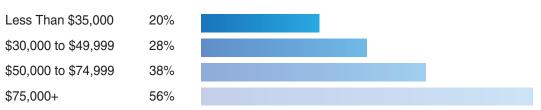
One-Third Of Americans Own Tablets

The Pew Research Center's Internet & American Life Project recently released survey results regarding tablet ownership in the United States. Among the findings: 34% now own a tablet computer compared to 25% in August 2012, 14% in February 2012, 8% in May 2011, and 3% in May 2010. Education, household income, and urbanity are all influential factors in tablet ownership. These charts illustrate those differences; the percentages indicate the number of adults owning a tablet within each group.

Education Attainment

Less Than High School	17%
High School Graduate	26%
Some College	35%
College+	49%

Annual Household Income

Less Than $35,000	20%
$30,000 to $49,999	28%
$50,000 to $74,999	38%
$75,000+	56%

Urbanity

Urban	33%
Suburban	37%
Rural	27%

Number Of Software Developers Set For Significant Increase

By 2019, there will be 26.4 million software developers worldwide, up about 45% from the 18.2 million today. Evans Data made the prediction in its "Worldwide Developer And Demographics Study." India and China will lead the growth, and Russia will dominate the Eastern European region. North America will experience slower growth. Evans Data's report shows that the number of developers in India will increase 90% by 2018, while the number of developers in North America will increase 25%. Janel Garvin, CEO of Evans Data, says that the Asia/Pacific region has shown the strongest growth for several years, with India being "the main powerhouse that's driving such a strong surge in developers in that region."

Carrier Wi-Fi Equipment Market "Red Hot"

Results regarding the carrier Wi-Fi equipment market, which includes Wi-Fi access points and Wi-Fi hotspot controllers, serves as somewhat of a barometer for the wireless carrier industry as a whole. That said, the industry is looking pretty good based on the latest Infonetics Research market report. "The carrier Wi-Fi space is red hot right now," says Richard Webb, directing analyst with Infonetics, "driven by the explosion in demand from mobile operators using Wi-Fi to augment their 3G/4G deployments and offload a portion of mobile data traffic to unlicensed spectrum." Carrier Wi-Fi equipment global revenues rose 53% from 2011 to 2012, and the research firm expects the market to reach $3.9 billion by 2017; this, according to the company, will be primarily driven by mobile operators deploying carrier Wi-Fi for data offload.

Inventory At Semiconductor Suppliers Declines

Semiconductor suppliers are clearing away excess stockpiles of product created during the economic woes of 2012, according to the latest "Supply Chain Inventory Brief" from IHS. Between the fourth quarter 2012 and first quarter of this year, inventory at semiconductor makers was down 4.6%, from $38.4 billion to $37.6 billion. At the same time, semiconductor revenues were down 5.1%, which IHS attributes to the normal seasonal demand pattern. However, consumer demand during that time period actually rose, IHS reports, as semiconductor stockpiles increased at distributors, contract manufacturers, and OEMs. Cell phone makers increased their inventories by 7.2% during the first quarter, and PC OEMs increased their stockpiles by 6% in part to keep up with demand expected during the second half of this year.

Need For Energy Not Slowing Down

Despite our best efforts to become more energy-efficient, worldwide energy use will increase 56% between now and 2040, according to the U.S. Energy Information Administration. In its "International Energy Outlook 2013," the administration shows that we consumed 524 quadrillion BTUs of energy in 2010; that number is expected to reach 820 quadrillion BTUs by 2040. Most of the increase is in the developing world, with half of the increase attributed to China and India alone. That increase is created largely by strong, long-term economic growth in those regions. Fossil fuels will supply about 80% of the energy used through 2040, but renewable energy and nuclear power are the fastest growing energy sources, increasing 2.5% per year.

Outlook On Tech Spending Lowered

In its midyear outlook, Forrester says it now expects global technology spending to be up 2.3% this year. That's down from the initial 3.3% it predicted in January. Spending in the United States and Japan increased more than Forrester initially expected, but not enough to make up for the deteriorating markets in Europe and China and mixed results in Latin America, Forrester reports. Software, particularly analytical and collaborative applications and SaaS products, was a bright spot, says Forrester vice president Andrew Bartels, author of the report. Other than enterprise purchases of tablets, he says, hardware sales will be weak.

Report Looks At State Of App Economy

Although smartphones and tablets are driving the app economy today, emerging platforms such as connected cars and smart TVs provide new opportunities for the future. Those are among the findings of a new report, "The State Of The App Economy," by AppNation Research. The report, which was produced in part by Reticle Research and Paradigm Sample, shows that the app economy will about double between now and 2017 from $72 billion to $151 billion, with email, Web browsers, and social networks leading in terms of usage frequency. Sales of physical goods and services account for the majority of revenue in the market; paid app downloads account for just $1 billion of the revenue. The report shows that most consumers find new apps via word of mouth.

Physicians Prefer Tablets To Smartphones

AmericanEHR Partners recently released a pair of reports stemming from a survey of 1,400 physicians regarding their use of mobile devices and electronic health records (EHRs): "Mobile Usage In The Medical Space 2013" and "Tablet Usage By Physicians 2013." According to the reports, 75% of physicians who use an EHR use a smartphone and 33% use a tablet, but physicians spend 66% more time using tablets rather than smartphones. Physicians find smartphones handy for many tasks, especially exchanging email messages; 75% report communicating with other physicians at least once per week. However, smartphones lose out to tablets when it comes to accessing EHRs, as 51% report using tablets to access EHRs compared to 7% who report using smartphones to do so. Of tablet users, 33% say they are "very satisfied" with their device and 44% say they are "somewhat satisfied," but only 18% (compared with 28% of smartphone users) are "very satisfied" with apps designed for their profession.

Cell Phone Use & Walking Don't Necessarily Mix

Think cell phone use is only a problem for drivers? Think again. According to new research from The Ohio State University, the number of "distracted walking" accidents doubled between 2005 and 2010. "If current trends continue, I wouldn't be surprised if the number of injuries to pedestrians caused by cell phones doubles again between 2010 and 2015," says Jack Nasar, co-author of the study and professor of city and regional planning at The Ohio State University. Although much attention is given to the problems of using cell phones while driving, Nasar says, "we need to also consider the danger cell phone use poses to pedestrians." Young people between the ages of 16 and 25 had the most accidents. Talking on the phone contributed to 69% of the accidents studied; texting accounted for about 9%.

PC Market Still Showing Signs Of Struggle

Worldwide PC shipments were down 11.4% during the second quarter compared to a year ago, according to figures from IDC. However, those numbers were slightly better than expected. Vendors appeared to be focused on inventory reduction during the second quarter, IDC reports, signaling both caution after a year of declining shipments as well as possible plans to launch new models during the second half of this year. "With second-quarter growth so close to forecast, we are still looking for some improvement in growth during the second half of the year," says Jay Chou, senior analyst, IDC Worldwide PC Tracker.

Study Shows Tech Innovators

The United States and China show the greatest potential to drive technology breakthroughs with a global impact in the next four years, according to the "Global Technology Innovation" report by KPMG. When asked which countries show the most promise for disruptive breakthroughs, 37% of survey respondents said the United States. China was cited by 24%, followed by India (10%), Korea (7%), Japan (6%), and Israel (6%). This year's KPMG survey marked the debut of an innovation confidence index, where tech leaders rated their countries on 10 success factors, including talent, infrastructure, and incentives. India ranked No. 1 on that index, with a score of 72, followed by Israel with 71 and the United States with 65.

Make Your Network Telecommuter-Friendly

Consider VPNs, Outsourced Management & Connectivity Upgrades For Your Remote Workers

THE NUMBER OF TELECOMMUTERS and remote workers continues to grow as technology is better capable of handling their needs. It's relatively simple to set up a laptop, phone, and Internet connection in someone's home or give an employee access to the company network while on the road. But in order to help an employee be productive while away from the office, you have to make sure your network is up to the task. The best place to start is to recognize your limitations and take advantage of solutions that are a fit for your company.

✔ Know Your Unique Challenges

When it comes to telecommuting, companies of all sizes will have to deal with the logistical concerns of employee location, but with larger organizations, the problem is compounded by the sheer number of employees. No matter what size of organization you work for, though, because employees are using their devices for checking email, accessing the corporate network, and other similar tasks, you'll have similar challenges.

For instance, mobile management is a universal challenge because telecommuters are often using multiple devices either from home or on the road. But companies may need to take very different approaches to handling this issue.
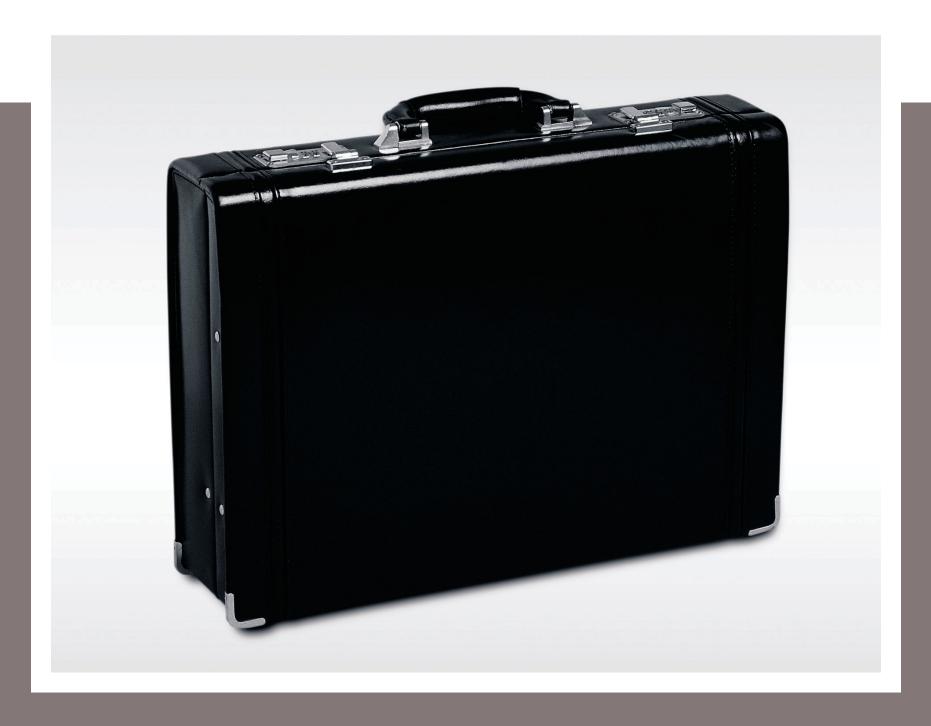
"You look at a big company that has tens of thousands of employees, and they can afford the luxury of setting up internal groups to support their mobile workforce," says Fran Caulfield, research director at The Insight Research Corp. "But for a small company, it actually makes more sense sometimes to outsource the management requirements because the outsourcer may have a much more effective and more secure network and have more technical knowledge that would be hard for a small company to replicate internally."

✔ Outsource Mobile Management

If you are a smaller company and decide to outsource management to support a certain amount of telecommuters, it can be difficult to know what to look for in a third-party vendor. Caulfield says there are quite a few providers that offer management capabilities for networking and mobile devices, but there is only a handful of national vendors. You may need to look for regional and metropolitan firms instead that can outsource these functions for you. "A lot of basic IT companies that started off maintaining computers have branched into mobile management of devices as well," Caulfield says, so contact your current vendors and ask if they provide these services.

Caulfield adds that many of these outsourced management services not only have features for the company, but also for the employee on the other end. Telecommuting requires a solid, reliable Internet connection regardless of the device the employee is using. That's why some third-party solutions offer tools that

help the "individual user understand roaming costs and bandwidth performance" and help them spot "security flags that may arise depending on the network they're on," Caulfield says. "There are individual things that the user can see by virtue of using some of these third-party platforms to help them also manage, from their end, the performance, access, and security of a mobile network environment."

✔ Establish A VPN Connection

The network connection itself is the most important aspect of telecommuting. After all, remote workers need access to the same resources as in-office employees. Companies need to look into building VPN networks that provide secure, consistent access to the internal network so that workers can safely use company resources.

One place to start is with an SSL VPN that is accessed via a Web browser, says Mark Tauschek, lead analyst at Info-Tech Research Group. "That's probably the key piece of infrastructure that you need to support remote worker access to the network," he says.

The great news for companies that don't already have a VPN in place is that, over the past few years, VPN connectivity has become much easier than it once was and is really pretty inexpensive, Tauschek says. "If you're talking about a small to midsized organization going out and buying an SSL VPN appliance that's going to support telecommuters accessing the corporate network, you're talking about a few thousand dollars to support probably 100 simultaneous, concurrent connections," Tauschek says.

✔ Upgrade Your Network Connectivity If Necessary

Although Tauschek says that many companies can "probably handle telecommuting with what they have in place," he also warns that you may need to upgrade your actual network connection "if you're looking at doing this on a significant scale." He says that some companies will have a business-class broadband connection that supports 10Mbps download and 1Mbps upload speeds because employees are typically downloading data much more often than they upload it. Telecommuting changes this entirely and therefore could require some upgrades to your network, but not necessarily your established infrastructure.

"When you're supporting telecommuters, you're supporting a lot more upload, because now I have to upload from my corporate Internet connection out to all of these telecommuters that are out all over the place," Tauschek says. "You're probably going to have to upgrade your network connectivity, but not so much your network infrastructure. If your network can support the users onsite, then it's going to be able to support them remotely in terms of the network infrastructure. It's really the Internet connection coming in that might need to be upgraded." ▣

✔ Monitor Your Network

In order to know whether your network can support telecommuting, you have to get a good view of it and understand how it's working. "You need to monitor it and have a sense of how much bandwidth you're really going to need to support something like this on scale," says Mark Tauschek, lead analyst at Info-Tech Research Group. "If I pilot it with five users, what does that look like when I scale it to 100?"

Monitoring your network will help you know how much capacity you need, what type of VPN solution will work best, and more. "The main thing is to understand the implications before rolling it out widely," Tauschek says. "You have to know what you're getting yourself into, plan accordingly, and roll out the infrastructure to support it ahead of time. Otherwise, you'll have problems."

✔ Don't Forget The Phone

It's easy to get wrapped up in VPN connections and other aspects of telecommuting, but you also need to consider phone systems as they often become an integral part of a mobile or remote workspace.

"On the telephony and unified communications side, there have been significant advances that allow us to basically put a softphone on somebody's laptop or have a call ring on multiple devices, like my cell phone or my home phone," says Mark Tauschek, lead analyst at Info-Tech Research Group. "If you really want to be able to support telecommuting, you have to have updated infrastructure that supports IP telephony and the ability to do these things."

BONUS TIPS:

✔ Build A Flexible BYOD Policy

"A lot of new [mobile management] solutions out there have tools that allow them to work with the changing mix of devices that keep coming onto the scene," says Fran Caulfield, research director for The Insight Research Corp. "You may buy a solution today, but you want something that's flexible going forward as new devices are released, so have BYOD policies that allow for technology evolution."

✔ Test Devices On Your Network

If you're going to allow employees to connect to your network using smartphones, tablets, or laptops, then you have to test those devices to make sure they will work as expected. Companies have more options today when it comes to mobile devices because they can either "buy the devices for employees and hand them out or instruct employees to buy from this small subset that they've tested and know work well with the network," Caulfield says.

Preventive Medicine For Your Servers

Steps You Can Take To Keep Them Maintained & Running Their Best

ENTERPRISES PLACE HIGH VALUE on servers for good and obvious reasons. Without them, business is essentially dead in the water.

Despite the importance of servers, they don't always receive the attention they deserve. Although there are viable reasons for this—scads of other pressing responsibilities for IT to tend to, for example—failing to regularly perform server maintenance and recognize the warning signs of oncoming server failure can lead to disaster. The following server maintenance-related tips can help prevent such a scenario.

✔ See The Signs

Dick Csaplar, senior research analyst at Aberdeen Group, says based on a previous position as server product manager, generally half of all server failures he dealt with were the result of hard drives gone bad. Of the remaining failures, half were due to the loss of power supplies and the remaining related to issues involving all other components. "Generally, there is little warning before these things go down, so being prepared is the best way of dealing with them," he says.

Outside of mechanical or physical parts wearing out, slowing down over time, or starting to fail more often, Greg Schulz, senior advisor at Server and StorageIO, says, "Servers don't really degrade so much as their usefulness is worn out."

For example, CPUs, DRAM modules, I/O busses, and adapters tend not to wear out but rather applications and software that use the servers become more demanding and complex over the server's life span. "The result is the server seems to degrade," Schulz says.
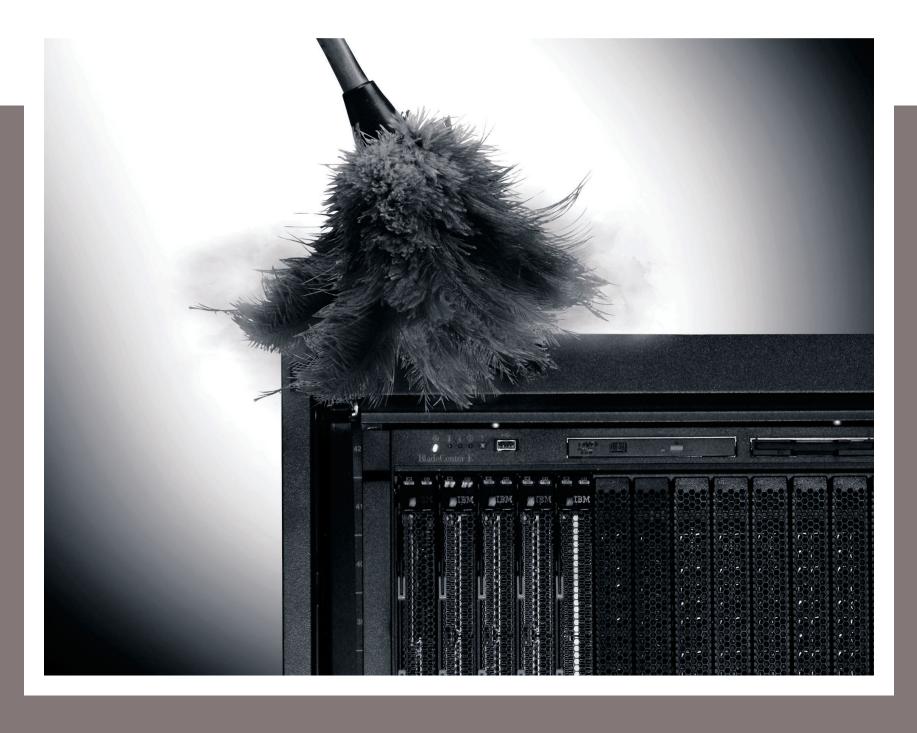
From a performance standpoint, he says, components typically continue performing at a relative rate (unless they take on a heavier load) until they actually fail. Overall, Schulz advises looking for components that offer good wear-leveling and endurance and factoring these traits into maintenance and product life cycles. "Good vendors will walk you through what they do, what to watch out for, how they manage and protect," Schulz says.

✔ Step Up Your Game

Schulz says there are some server maintenance-related tasks IT could potentially do better, including maintaining a baseline that indicates server performance; availability; errors, events, and alarms; temperature; and power consumption in order to know what activity is normal. "Also pay attention to noise levels in and around servers, particularly with denser environments, to make sure or eliminate the chance of a loud or potentially failing server impacting other devices," he says.

IT should also learn to play the temperature-balancing act, he says. Too much cooling and you're wasting energy; too little and you risk introducing problems. Ensure PDUs are working with good, clean, and stable power (as well as backup or standby power), Schulz says, and don't forget to maintain batteries.

Charles King, principal analyst at Pund-IT, says people who regularly visit or inspect enterprise data centers often report facility

managers seem overwhelmed by the sheer size and complexity of their tasks.

"That manifests itself in common practices and jobs being ignored—thermostats broken or incorrectly set, servers up and running but empty of applications, disk arrays operating at a fraction of their capacity, 'locked' doors with their latches taped open." Individually, such mistakes may sound inconsequential, but they can "be expensive in aggregate and downright dangerous if they result in a security breach or key system failure," he says.

Csaplar says managers should also maintain server maintenance contracts. "Most servers come with a three-year warranty with options to purchase years four and five," he says. If the server runs mission-critical apps, seek maintenance contracts with four-hour response times.

✔ Be Persistent

A good deal of server maintenance involves sticking to a regular schedule. King says items on his to-do list include regularly checking facility systems (including cooling and power) and following up with occasional surprise inspections. "It's a boring job no one wants to do, meaning it's usually put off or ignored," he says.

Other tasks that may be mundane but yield positive results (particularly in virtualized environments), King says, include mapping system application and storage dependencies and ensuring systems are running correctly and are consistently updated.

Schulz advises routine cleaning, especially with power supplies and with cooling fans to ensure there's good airflow. Additionally, monitor temperature limits; follow vendor suggested best practices; update applications, OSes, and virtual machine software; and update firmware (PSUs, BIOS, drives, remote monitoring and alert systems, and KVMs).

When performing cleaning and maintenance, he says, pay attention to "alerts and watch for trends to detect early signs of something giving way. Where needed, look at adding more or newer, faster memory or other midlife enhances to extend the usefulness of the server," Schulz says.

✔ Maintain Services

Even mildly important servers, Csaplar says, should have certain services in place, including regular data backups. Also, protect mission-critical applications using cluster or fault-tolerant hardware, he says, and have antivirus software in place. "These steps will allow for a quick recovery with minimal impact if a server does go down," Csaplar says.

Schulz says the most obvious problems often are overlooked. For example, PSUs and cooling fans that slowly degrade over time will possibly draw more electricity, and servers in lower power consumption modes will run slower. Schulz says to address the obvious first and go from there. "You might be surprised what's not being done or occurring." Watch for errors at the physical server and for network retransmissions and slow applications that appear related to servers but aren't. ℗

✔ Share Responsibilities

Pund-IT principal analyst Charles King suggests divvying up server maintenance responsibilities.

"Don't drop the task on any one person's desk. Share it among several people, so no individual feels put upon," he says. "Plus, if or when staff members leave, the core knowledge doesn't walk out the door with them."

King also recommends checking with your vendors for tips or tricks to make maintenance easier. "Data center efficiency, particularly related to power consumption and cooling, is a hot topic, and many vendors offer a variety of monitoring tools and features," he says.

✔ Monitor Performance

Greg Schulz, senior advisor at Server and StorageIO, says data center managers need to monitor both physical and logical servers to check their performance against a baseline and spot potential issues. Additionally, mix in periodic walkthroughs, he says, looking for anything out of the norm that may be occurring but isn't triggering alerts.

"At some point, there is a decision whether to simply repair, upgrade, or replace a server," Schulz says. "However, with newer fans, 80 Plus-efficient power supplies, and other Energy Star components, [server] life can be extended by adding more memory, faster storage, and adapters."

BONUS TIPS:

✔ Acquire The Tools

Greg Schulz, senior advisor at Server and StorageIO, says monitoring tools, including DCIM solutions, can prove useful where server maintenance is concerned both for real-time and historical purposes. This includes using a solution to capture alert and alarm information; set configurations; and view status, health, and performance information when making baseline comparisons.

✔ Treat Servers Like Servers

Defragmenting server hard drives is among the server maintenance practices that Dick Csaplar, Aberdeen Group senior research analyst, recommends to keep servers running optimally. "Good server health comes from surrounding the server with backup and protection services," Csaplar says.

Build A Better Wireless Network

Plan Capacity Based On Device, Application & Coverage Requirements

WITH SO MANY WIRELESS DEVICES in the workplace, you're probably planning for the day when your network reaches critical mass. If you think your network is in need of an upgrade to keep up with new devices or to extend your coverage area, consider the devices and applications your employees use the most and where they are located. If you do, you can build a solid wireless network.

Determine Your 'Worst-Case Device'

You can invest in the fastest, best performing wireless access point, but if the devices used in your organization can't support those speeds, you won't see much benefit.

Tim Zimmerman, research vice president at Gartner, says companies will sometimes perform site surveys with a laptop to determine the proper coverage area, but that laptop may have a high-powered radio and two antennas.

"A CIO or CEO might sit down and put his tablet right next to a working laptop and not be able to connect," Zimmerman says. The tablet only has a single antenna and a less powerful radio, so it needs to be closer to the access point for a solid connection. Zimmerman adds that smartphones tend to have few issues with Wi-Fi connections, so it wouldn't be a good idea to use those for a site survey either. The key is to find the weakest device, determine where it is being used most often, and then adjust your coverage area to match.

Know What Capacity You Need

Coverage area isn't the only thing that affects a wireless network's perceived performance. For instance, some applications require more networking resources. John Kindervag, principal analyst at Forrester Research, says, "If you're using bandwidth-intensive applications like VoIP, YouTube, or videoconferencing, they suck up a lot more bandwidth than email."

Consider how each employee will use the network and whether everyone will be accessing applications at the same time. Zimmerman says a solid rule of thumb is that most users will require 5MB of throughput at any given time, although 2 to 3MB is sufficient for most high-definition video streaming requirements.

Most companies will want a 300MB networking device, Zimmerman says, which can provide about 150MB of throughput in practice. At 5MB per person, you should be able

Key Points

- Determine your necessary capacity by finding the weakest device and figuring out how employees will use the network.

- Set up a guest access network that doesn't connect directly to internal resources or has access control and security in place.

- Don't focus on implementing the latest, greatest technology. As long as your needs are met, you can save money by simply maintaining the status quo.

to support 30 simultaneous connections with few performance issues. Scale that number to determine how many access points you need.

Ed Lane, regional account manager at Gillaspy Associates (www.gillaspysales.com), says it's often not necessary to blanket your entire building or saturate all corners of a facility. "Evaluate your building layout and think through the possibility of where wireless coverage is needed. Wireless access points can be a wireless 'tip' to an otherwise wired network. For example, a conference room with guests and visitors could be hard-wired in to the network, but a centrally manageable wireless access point with very little broadcast range can offer wireless to that room only."

Set Up Wireless Guest Access

To accommodate employees from branch offices or visitors to your facility who require Internet access, set up a guest network with certain security measures in place. Zimmerman says users can advertise their guest access SSID and then the visitors will connect to it and be directed to a captive portal. A captive portal makes it so that when an outside user connects, "you know their MAC address, have them enter their email address, and then you send them a password." It's a great way to track who's connected to your network and what they're using it for.

Kindervag says companies need to implement dedicated wireless intrusion detection sensors, so you can know what's going on in the air around you to protect your network. Lane adds that wireless intrusion prevention systems "provide comprehensive protection and management of security concerns like rogue access points, unauthorized authentication, signature Wi-Fi attacks," and more.

Don't Overspend On Upgrades

Zimmerman says companies often want to invest in the latest technology, even if it's unnecessary. With wireless networks, 802.11ac products are becoming more common. Although 802.11ac solutions are faster than 802.11n and other wireless protocols, Zimmerman says these products are released in two waves. The first wave gives you performance, and the second wave actually "provides you the value of multiuser MIMO capabilities." But that wave is a couple years out.

Instead of opting for unnecessary upgrades, Zimmerman says to look at your capacity requirements and determine if your network meets those demands. If it does, you may not need to fully upgrade your infrastructure.

In fact, Zimmerman says, most organizations should be fine with an 802.11n network for the next three to five years as long as it's maintained properly.

"What we tend to find is that people want to push the technology limit, but they really don't have to," he says. "We don't advise people that they need Gigabit Ethernet down at the edge of the network on the wired side, so in the same aspect, almost every solution in the enterprise environment can be solved by 801.11n today. I would not pay a premium for 802.11ac. It's a new technology and it's faster, but you may not need faster. You can only go 55mph, so the fact that it allows you to do 110mph doesn't give you any value." ▣

Top Tips

✔ "One thing people don't realize is that wireless networks have completely different protocols than wired networks," says John Kindervag, principal analyst at Forrester Research. "Wireless isn't switched, it's shared. You may think you have a high-speed wireless network, but in fact, you might have it over capacity so it bogs down."

✔ "A good rule of thumb is that whatever the noted bandwidth is or noted speed of the network, you're going to get about half the performance," Kindervag says. "If it says it's a 100MB device, assume you're going to get 50MB in real-life, because it's a very chatty protocol with a lot of overhaul."

✔ "You need to calculate capacity, usage, and everything in the background, and you shouldn't do that in your head," Kindervag says. "Most of the wireless networking tools have planning software to help you do that, so you can virtually plan what you're deployment areas need to be based on how you think people are going to use the network."

Action Plan

The following wireless network security steps were provided by Ed Lane, regional account manager at Gillaspy Associates (www.gillaspysales.com):

■ Review your wireless needs and make sure you're only giving access to people and areas that legitimately need access. Minimize your variables and attack vectors or hacker entry points.

■ Set up a stringent security plan based on your company's security policies that include hidden SSID and non-broadcasted networks, a strong authentication encryption type, and policies for regularly changing Wi-Fi passwords.

■ Maintain your Wi-Fi. Don't forget about what is most likely your most vulnerable threat vector. Regularly update your access point firmware. Check your security logs often. Change passwords regularly, and keep your SSID hidden.

Get Started

As with any data center improvement project, planning ahead is the best way to ensure success. "Be thorough in collecting corporate use cases and specific business objectives," says Ed Lane, regional account manager at Gillaspy Associates (www.gillaspysales.com). "Failure to plan adequately puts your company, your data, and frankly your job at risk. Plan a thorough security policy and insist on buy-in to that policy to the very top of the organization. You'd be hard-pressed to find a top executive that thinks security is unnecessary. By achieving top-level buy-in, you pave the way to be able to create and maintain a secure Wi-Fi network without interference."

SIX QUICK TIPS

Understand Cooling & Airflow Issues

Identify Trouble Spots To Enhance Efficiency & Cut Expenses

COOLING IS UNDOUBTEDLY one of the most important aspects in running a cost- and energy-efficient data center. But experts agree most companies could be doing a better job in any number of facets relating to cooling, including airflow. The following advice can help you better understand, visualize, and identify cooling and airflow issues in your data center and take steps to remedy them.

✔ Measure & Monitor

For enterprises committed to making cooling and airflow conditions a priority, begin by having a comprehensive understanding of the data center environment. "You can't properly manage what you haven't measured," says Jenna Maertz, research analyst at Info-Tech Research Group.

Maertz says that separating out the data center power bill can provide a company with a baseline it can use to compare improvements against later. "This can help make the case when justifying future efficiency initiatives," she says. "If you compare the amount of power that is consumed monthly to the data center's total power capacity, you will have a proper baseline to determine how efficient your data center is, and from there you can begin to search out options for improvement." Not doing this, she says, lessens the perceived impact of any future improvements you make.

✔ Know Your Environment

How do you know if your data center has cooling and airflow problems? By getting a better understanding of your environment.

Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says an easy way to get started is by walking the cold aisles. Significant temperature variations, he says, warrant further investigation.

Be sure to measure airflow and the temperature of air discharged from perforated tiles using a device called an anemometer. A CFM of between 400 and 500 is ideal, Koty says. "If you don't have an anemometer, a quick and easy way to check airflow from your perforated tiles is to take a crisp dollar bill and hold it over the tile against the palm of your hand. You should be able to raise your hand around four to five inches above the tile and still have it stick to the palm of your hand."
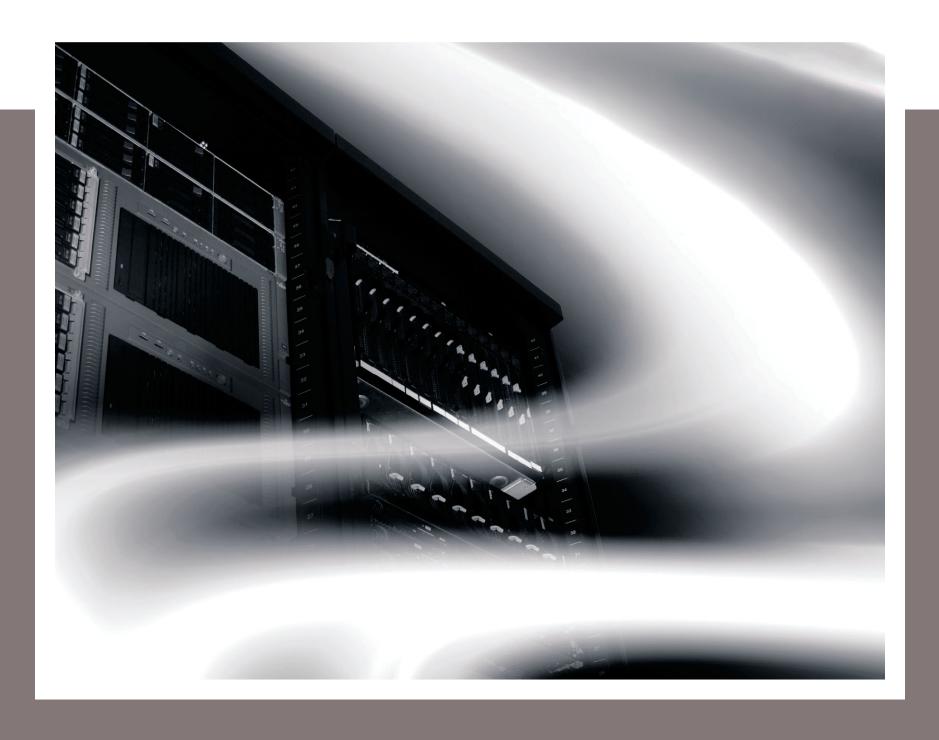
If you are experiencing equipment malfunction or premature failure in one area, Koty says, monitor the temperature of the equipment within a cabinet or in the aisle and look for anomalies throughout the day.

Laura Viars, senior sourcing specialist at Rackmount Solutions (800/352-6631; www.rackmountsolutions.net), says a remote monitoring system can help you can keep your eyes on the temperatures at all times. "If you are on a tighter budget, certain filler panels can be fitted with a temperature strip, allowing you to visually assess the internal cabinet temperatures."

✔ Cooling & Airflow Are Related

"Cooling and airflow issues often go hand-in-hand, as poor airflow management is a leading cause of inefficient cooling," Viars says. "Oftentimes, data center

managers mistake poor airflow for insufficient cooling capacity."

Viars says airflow issues most often occur under the raised floor, along the aisles, or within the cabinets. At the raised floor level, airflow impedance is a common issue, she says. This can be caused by problems such as poorly planned placement of CRAC units, excess or unruly cable bundles, misplaced perforated tiles, or the presence of pipes and other unmovable structures.

Along the aisles, Viars says, one of the biggest causes of inefficient cooling is bypass air, or when the cold air supply is not being used to cool the equipment as intended. Instead, it mingles with the ambient room air and enters the cabinet at a much warmer temperature than what is ideal.

From within the cabinet, recirculation is a significant cause of cooling issues, she says. Recirculation is caused when the air doesn't reach the equipment as it should. Instead of the equipment pulling in cool air, it pulls in the warmer air circulating within the cabinet, raising the operating temperature of the equipment in a vicious cycle, she says.

✔ *Implement Free Or Cost-Effective Solutions*

When it comes to improving cooling and airflow, there are several low- or no-cost steps you can take. If the issue stems from insufficient cooling making its way up from under your raised flooring, Viars says to make sure cables are neatly secured in trays or bundles.

Viars says you also need to make sure the location of your CRAC units makes sense in relation to where the air needs to go and that perforated tiles are located so that the equipment above can benefit. Cover up any gaps where the cabling runs from under the floor into the base of the cabinet, she says.

Be sure all CRAC and CRAH units are operating at factory-designed BTU outputs, Koty says. Make sure the filters are inspected and replaced on a regular basis, that you inspect and clean the cooling coils regularly, and that the fan CFM output is at factory specs. Something as simple as a loose belt, he says, can greatly reduce air output.

Check to see if there are spaces between your cabinets or where the cabinets meet the floor, causing bypass air, Viars says.

"If so, consider blocking off those spaces with an expanding foam seal and under-rack panels. Products such as these will ensure proper airflow within the aisle."

Inside your cabinets, be sure you are using filler/blanking panels to cover up any unused spaces within the cabinet, which will decrease the chances of recirculation. "Tower-style servers should be placed on their sides on a shelf or bracket kit, to avoid large, open gaps," Viars says.

If you have cable access points on top of the cabinet, reduce the instance of bypass air by using brush-style grommets within those holes. "Ensure that the cable management within your cabinet is neat and tidy, so that it causes minimal airflow obstruction," she says. ℗

✔ *Know The Primary Causes*

Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says the most common cooling and airflow-related issues come down to these four things:

- Inadequate number of CRAC/CRAH units to cool the total load.

- Not configuring the servers in a hot aisle/cold aisle configuration.

- Not sealing cable openings. The total airflow through the perforated tiles will increase by nearly 66% by simply sealing off these openings.

- Cable congestion under in the raised floor plenum.

✔ *Tap In To "Free" Cooling*

"Free cooling," or air-side and water-side economizers used to complement mechanical cooling, has gained increased attention. Jenna Maertz, research analyst at Info-Tech Research Group, says these approaches can definitely save money, but compared to other cost-saving measures, they can lead to less of an increase in efficiency and involve costs associated with switching over to a free-cooling solution.

"Organizations that adopt free cooling technologies report that they saw a 10% improvement in their data center efficiency," she says. "In comparison, organizations also report that using precision cooling solutions improves efficiency by 25%, using a hot and cold aisle design has a 41% improvement, and replacing HVAC with other more precise solutions leads to a 45% improvement in efficiency. Many of these solutions do require heavy investment, though," she says.

"Info-Tech has found that cooling renovations in the data center cost a median of $50,000 to $100,000 (or roughly $87 per square foot), so this isn't a project to be conducted on a whim," Maertz says. She advises doing a cost-benefit analysis.

BONUS TIPS:

✔ *Beware Of Overcooling*

With all the concern about making sure you're providing enough cooling to data center equipment, one common mistake is overcooling. Many companies target data center temperatures at about 70 degrees Fahrenheit despite modern equipment being able to run at temperatures as much as 10 degrees higher, according to industry estimates. Experts advise simply increasing the temperature so that it hovers around human comfort levels.

✔ *Share The Responsibility*

Both the facilities and data center groups share responsibility for cooling and airflow issues. However, Jenna Maertz, research analyst at Info-Tech Research Group, says the reality is "73% of organizations don't split energy bills between overall facilities and the data center and therefore have no real visibility into their data center cooling costs. This makes cooling and airflow a problem for both IT and facilities." This type of arrangement also decreases a company's incentive to make improvements because the data center lacks direct accountability, she says.

Protect Your Network From The Newest Threats

Targeted Malware, Longline Phishing & Other Attacks Can Leave Your Enterprise Vulnerable

SECURITY SOLUTIONS are more advanced than ever, but so are the malware programs that are trying to burst through your defenses. It used to be that you could run a simple virus scan and remove most, if not all, of the malicious programs from your computer. But now, hackers are growing more sophisticated. That's why it's not only important to have strong security controls in place, but to also educate yourself on how these malware programs attempt to trick users into infecting individual machines.

✔ New Threat: Targeted Malware

Attacks have become more sophisticated. For instance, email phishing schemes started off with emails designed to entice users to click links, but people eventually figured out how to spot these messages. Now, these messages are much more in-depth, sometimes copying company logos and email signatures to appear legitimate. Plus, attackers are now able to utilize targeted malware that is aimed at specific people within an organization.

"[Hackers] use attack vectors, like traditional phishing attacks, to craft customized phishing emails that are very hard for even a trained employee to recognize as illegitimate," says John Kindervag, principal analyst at Forrester Research. "Within that, they'll try to have some attachment or document that's been weaponized using a [program] flaw so they can eventually get deeper and deeper into the network because they've gotten into a machine on the local area network. And, unfortunately, a lot of people don't monitor the behavior of those machines."

✔ Other Threats To Consider

There are other new types of attacks to consider, too. In terms of phishing, for example, Jessica Ireland, consulting analyst at Info-Tech Research Group, says that hackers are going much more in-depth with their email phishing scams and are employing a tactic known as "longlining."

In the angling world, longline fishing involves attaching a number of lines and hooks to one longer line. This makes it possible to catch more fish at one time. In the technology world, longlining is similar, except you replace the bait on those hooks with emails and those fish with your employees. The idea is to catch as many victims as possible, have them click a link in the email, and infect their machines. If a hacker is able to gain access through multiple portals, then it's more likely the hacker can grab sensitive information before anyone notices.

Kindervag says that viruses themselves also are growing more complex. "Probably the newest thing is the unlimited variance that an attacker can create through these modern malware kits, so you can always create a piece of malware that your antivirus system hasn't seen," Kindervag says.

"We're even seeing some trends where malware authors are making malware that understands the environment that it's in.

For example, because there's been a big movement toward sandboxing technology to identify zero-day malware, we're seeing some evidence that the malware looks to discover whether it's in a sandboxed environment and then will act differently inside the sandbox than in a normal environment."

✔ Is Your Existing Security Approach Enough?

If your company is in a particularly low-risk industry and doesn't deal with sensitive information, then your existing security infrastructure may be enough, as long as you take the right steps to maintain it.

"Organizations can obviously improve their existing systems by staying on top of updates, but attention must also be paid to process in conjunction with technology," Ireland says. The only way to make sure your security solutions will perform effectively is to make sure your employees know how to use them and to supplement your security controls with rock-solid policies.

✔ New Solutions & Strategies

Even if you have a strong security approach in place, there's likely room for improvement. Vendors are constantly working on new security technology designed to protect your network and data from all angles. For instance, next-generation firewalls add more features, such as Web content filtering and data leakage protection, to the traditional firewall, Ireland says. She also adds that companies can look into newer security solutions such as security incident and event management (SIEM) systems that assess risks and alerts to let you know of potential attacks and network access control (NAC) systems that help you control access to your network much more effectively.

Kindervag says having visibility into your entire network is going to be really important but adds that encryption will be equally important because "at the end of the day, you probably can't stop all attacks. Some of the newer technologies around encryption are going to be very helpful, because while we may not ever be able to stop data theft, we could make sure that when an attacker gets our data, it's encrypted and can't be monetized or come back to get us in trouble from a regulatory perspective," he says.

Kindervag stresses that technology isn't enough when it comes to security and that employee education can only go so far. "We trained users to click on links and then we yell at them when they click on the one malicious link out of 5,000 previous links that were good," Kindervag says.

His solution is to stop thinking about networking and security as two separate domains and instead simply create secure networks. If you can build security controls into your network and then encrypt your data on the back end just in case an attacker gets through, you'll be much less likely to suffer major losses and will have a solid foundation to build on in the future. ▣

✔ Rethink Network Architecture

"There will always be newer technologies to deal with malware," says John Kindervag, principal analyst at Forrester Research. But the most important issue, Kindervag says, is that many companies are suffering from network architectural problems. He says that we've been building our networks based on older, traditional foundations that simply don't stand up to current malware capabilities.

"We have networks that were designed in the last century that are not very resilient to attacks, because the concepts of networking that we use today were created before there were attacks," says Kindervag.

"We have to redesign our networks. We have to switch from focusing on protecting the network, devices, or even users and focus on protecting the data. Data is the thing that has value and gets us in trouble if we lose it, and data is the thing that we need to focus on. Being more data-centric is going to be very important as we move forward if we want to achieve any level of security."

✔ Build A Better House

Companies need to take a different perspective when it comes to both their network architecture and malware and other threats. John Kindervag, principal analyst at Forrester Research, says organizations need to understand that "there's always going to be a problem." He compares networks to houses located in tornado-prone regions. "If you live in a tornado state, you don't try to stop the tornadoes, you try to make the houses stronger and safer and you try to do something to make it more survivable," Kindervag says. "The important thing to remember is that it's an adversarial business. You're not trying to focus on a particular attack; you're trying to distinguish good traffic and packets from bad traffic and packets."

BONUS TIPS:

✔ Create Consequences

You can implement every security solution in the world, but without enforceable policies, you'll still struggle. "Proper policies and consequences for not adhering to those policies must be considered alongside technology solutions," says Jessica Ireland, consulting analyst at Info-Tech Research Group. "Training should follow policies as well because users can't be blamed for not knowing when the organization doesn't take the steps to make them aware."

✔ Centralized Security

If you feel like your individual security solutions are getting out of hand, then you may want to look into consolidating them. Ireland says that tools such as next generation firewalls help give you a more "centrally managed, streamlined solution" and that "consolidation doesn't mean less effective." She says solutions such as next-generation firewalls can "save a couple of headaches, while actively protecting your network."

Clean & Maintain Data Center Flooring

The Proper Approach & Techniques Can Make All The Difference

TYPICALLY, CLEANING AND MAINTENANCE are good things. This is certainly true of data center flooring, where dust and other contaminants can collect and do damage. But there is a caveat. In data centers it's especially imperative that cleaning and maintenance is done properly. The wrong cleaning techniques and materials, for example, can actually do long-term damage. In fact, while cleaning floors may seem simple enough, it can pay to let professionals handle certain tasks. Here are some tips for maintaining and cleaning data center flooring.

✔ Make Cleaning Important

Many data center managers feel that assigning a cleaning crew will cause downtime. As a result, they may not perform flooring maintenance as frequently as they should, says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

"In actuality, though, floor maintenance doesn't necessarily cause any downtime at all," she says. "While it's recommended that it be conducted when traffic within the center is at a minimum, keeping equipment live during maintenance is typically not a concern."

Routine flooring maintenance is actually critical to sustaining an ideal environment for electronic equipment, as clean flooring "can actually extend the life of your equipment and reduce the downtime that can occur as a result of dust and dirt accumulation," she says.
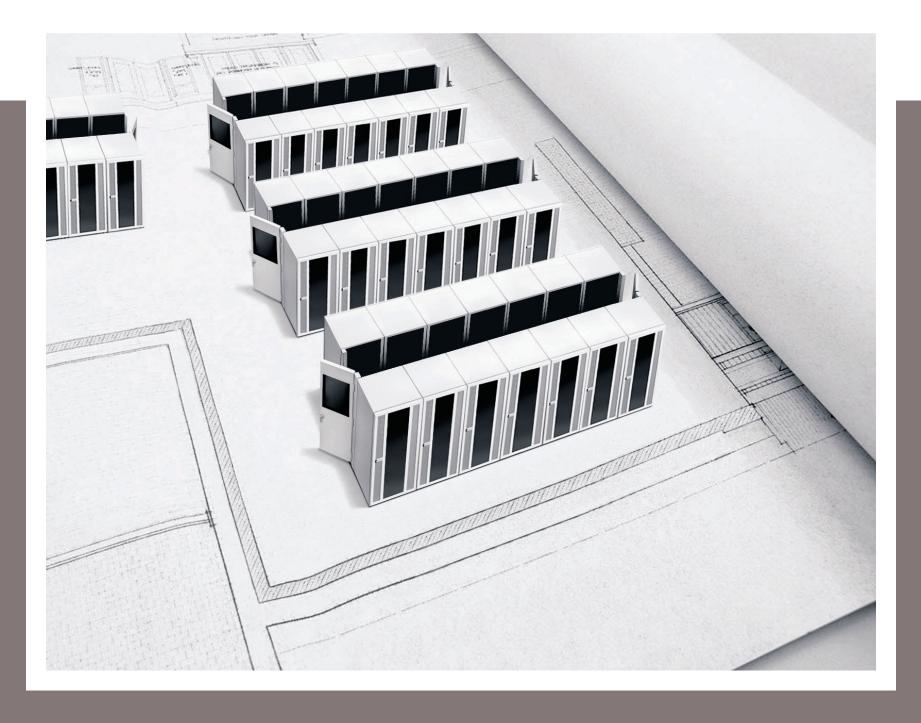
Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says cost can also play a role in regular flooring maintenance. Plus, he says, "there's a risk involved in performing this job. You must ensure whoever is doing this task fully understands the ramifications that can occur if not properly trained, supervised, and being extremely careful while working around the cables below the raised floor."

Cleaning is vital for numerous reasons. For example, if a subfloor plenum is dirty, the cooling system will deliver contaminants directly to sensitive electronic equipment, Koty says. "Contaminants can lead to overheating; corrosion damage; and electrical and mechanical failure of disks, tape drives, power supplies, and circuit boards," he says. "Debris shouldn't be allowed to accumulate in the subfloor. Regular cleaning keeps contaminants from becoming airborne and entering the intake air vents of your computer equipment and underfloor fire alarm sensors."

✔ What & How To Clean

In addition to using a good vacuum with a HEPA filter to clean raised flooring, Koty advises cleaning all perforated tiles at least once a year. Koty has found through experience that removing and cleaning perforated tiles outside the raised floor area with a pressure washer does a great job of removing embedded dirt. Dry the tiles in a clean, sunny place and have spare tiles to replace the dirty ones you're removing so you don't interrupt the airflow design.

Viars says standard flooring maintenance includes frequent vacuuming, including under racks, as well as damp-wiping other data center surfaces such as cabinets and work surfaces that can collect dust.

"In raised floor environments, cleaning of the subfloor plenum is definitely a basic; however, it's usually not done too frequently," she says. Viars recommends having a preventive maintenance schedule with the frequency of various tasks dependent on the data center's size, amount of traffic, and other factors.

Generally, maintenance of subflooring in data centers with raised flooring is recommended at least once yearly with tasks such as vacuuming dust and other contaminants to ensure air being brought into the data center is as clean as possible. Floor surfaces should get a basic dry cleaning (vacuuming) weekly and damp cleaning at least quarterly.

✔ *Cover The Basics*

For Koty, data center flooring maintenance begins with preventive maintenance, specifically "keeping contaminants out of the data center in the first place." Keep doors closed at all times; limit access to necessary and authorized personnel; use contamination control mats at all entrances, particularly antistatic mats that dissipate static electricity; don't allow food or drink in the data center; don't unpack or assemble items in the data center; don't store paper, cardboard, or similar supplies that may shed and collect contaminants; perform work outside the data center; ensure any tools and equipment that do enter are clean; and replace any floor tiles showing excessive wear.

✔ *Do This, Not That*

Though many companies have their in-house janitorial staff clean data center flooring, Viars says it's worth considering using a professional to ensure flooring and equipment are cleaned with proper chemicals and methods and to prevent untimely degradation or unwanted contaminants.

As for technique, don't sweep flooring as it only makes dirt particles airborne and pushes them into panel cracks and through cable cutouts, Koty says. If using a mop, ensure that floor tiles are vacuumed prior to mopping. Always use a clean mop dedicated only to data center use, and ensure chemicals used are approved for data center use.

In addition, he says, be sure to wipe rack tops and the insides of cabinets with lightly dampened, clean disposable cloths; empty vacuum cleaners and other equipment outside the data center; only plug vacuums and other cleaning equipment into maintenance outlets (not server outlets); instruct anyone performing cleaning which outlets to use and why; inspect flooring surfaces for irregularities that suggest other problems (a black dusty coating can signal worn or misaligned A/C fan belts, for example); and if using cement-filled tiles, ensure cut edges are coated with a sealant to avoid dust coming off the cut edges. ▣

✔ *Use Caution With Chemicals*

Damp cleaning of data center flooring and applying certain finishing techniques are typically better left to professionals, says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). Depending on the flooring, specific chemicals and solutions should or shouldn't be used.

"Allow a data center cleaning professional to apply all chemical substances or at least evaluate your center and advise you on what types of chemicals should be used for your flooring," she says. Vacuuming is generally simple enough, she says, but there is a science to how many floor tiles should be removed at once to prevent airflow and overheating problems.

✔ *Get Physical*

The data center flooring's physical attributes can help determine the cleaning approach that's best. Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says to ensure, for example, floor tiles aren't wrapped in sheet metal, as a galvanized coating can lead to zinc whiskers. Purchasing tiles that aren't wrapped in sheet metal eliminates this problem and the need for inspecting and cleaning, he says.

Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says to never apply wax to high-pressure laminate raised floor surfaces. Instead, use approved antistatic finishes. Certain tiles, including vinyl composition tile, should be stripped and refinished periodically, she says. Vacuuming is the recommended dry cleaning method regardless of flooring, she says.

BONUS TIPS:

✔ *Hire A Pro*

Depending on a data center's size, flooring maintenance can be a cumbersome job for data center personnel, says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). Many managers, she says, "are already doing the right thing by contracting professional data center cleaning specialists, even if the sole motivation is convenience." A specialist will be familiar with short-term and long-term benefits and hazards of using different finishes and cleaners, she says. Many data center cleaning services can clean flooring as well as subflooring, cabinets, and ceilings and conduct air-particulate testing.

✔ *Follow This Schedule*

Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com) recommends cleaning flooring and equipment surfaces at least quarterly and cleaning the subfloor plenum at least yearly. Change air-handler filters every three months or more frequently when a data center comes online or if you suspect the environment is especially dirty. "A newly constructed or recently renovated data center environment will be especially dirty and will require more frequent cleaning," Koty says.

Troubleshoot Cabling Issues

What To Do Before & After Problems Arise With Data & Network Cables

TWO THINGS SEEMINGLY constant among all cabling issues is that they happen at the worst possible time (read: during off hours) and they need to have been resolved five minutes ago.

Fortunately, you can recognize some cabling issues early on, so you can employ preventive measures. "If the cabling looks like it will cause problems, then it will probably cause problems," says David Kozischek, enterprise market manager at Corning Cable Systems (828/901-5000; www.corning.com /cablesystems). Beyond identifying cabling problems, however, you need some troubleshooting advice for how best to fix them.

Know What's Common

Many common cabling issues are due to the lack of a well-thought-out plan.

Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says it's easy to skip best practices and jump into cabling when the first racks are installed only to experience problems later.

Looking to standards can pay off. Kozischek says standards exist "to create robust, easily maintainable, future-proof networks so that the cabling and connectivity doesn't cause problems." Not following the guidance provided by standards is the most common mistake enterprises make, he says. He advises looking to TIA/EIA 942 (the telecommunications infrastructure standard for data centers) for detailed guidelines and requirements concerning data center or computer room design and installations regarding cabling and connectivity.

Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www .rackmountsolutions.net), says cabling often contributes to network connectivity issues.

EMI interference can hamper network speed if cabling is too close to electrical sources, with fluorescent lighting a frequent offender. Seasoned cabling installers generally know of such issues and have the installation expertise and a clear, defined plan that avoids this issue. Poorly crimped cables and cables with loose ends are other potential trouble spots. Viars says lower-quality cabling might save money, but "you do get what you pay for."
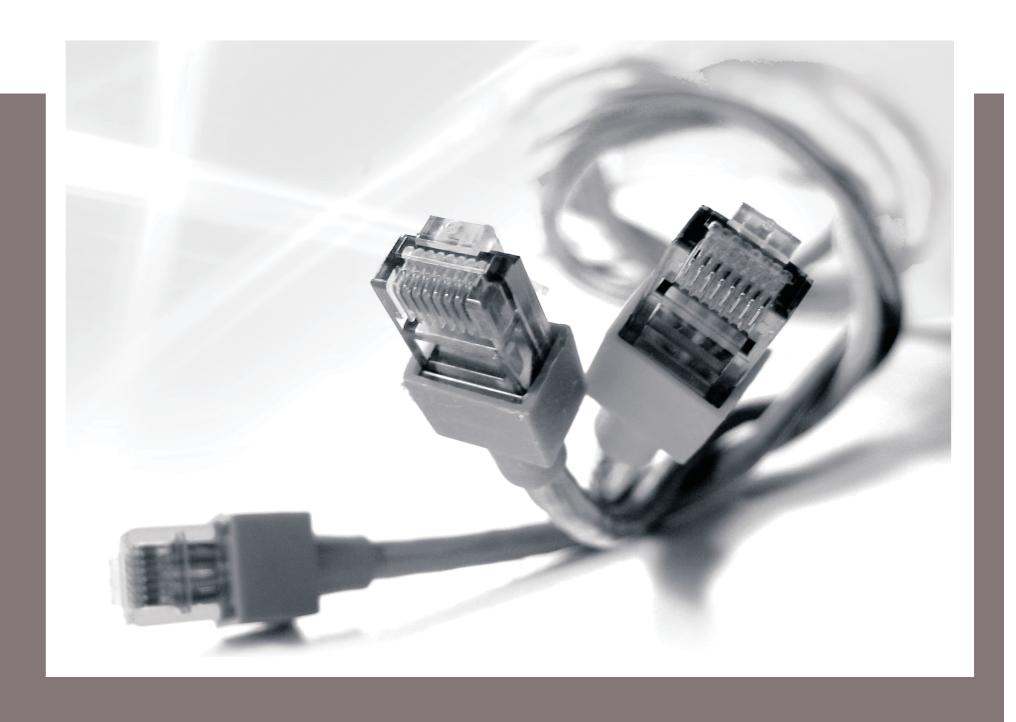
Take A Preventive Approach

A well-documented cabling system is invaluable for quickly identifying cables,

panels, and ports when problems occur, says Tom Hodson, director of sales at Total Cable Solutions (888/235-2097; www.totalcable

solutions.com). Keep this documentation in-house and updated whenever adds/changes occur, and require installation personnel and/or vendors to provide all related information (cable serial numbers, raceway paths, trunk/panel ports used, etc.) from the beginning to end of each link and grid/location coordinates for each termination along the link.

Also important is using high-quality products. Kozischek says customers often view jumpers as being almost disposable and base buying decisions solely on price. "These are the interfaces into your electronics and the area where most problems occur," he says. Instead, consider high-quality jumpers with low insertion loss and very low bend loss. "Jumpers get moved around and kink up at some point. You can avoid

the downtime with a jumper designed to perform even when that happens," he says. Kozischek also recommends using installers trained in proper fiber optic techniques, as they may back products with a 15- to 20-year warranty through the manufacturer.

Other preventive measures include using color coding, which Koty says helps provide quick cable visual identification, simplifies management, and saves time when tracing cables. Koty also says to run cables in the hot aisle when running power and data cables under floor, avoid installing cables too long or short (short cables risk disconnects if bumped; long cables consume space, waste money, add clutter, and can make troubleshooting more difficult), pull old cables when changing/replacing

cables, use cable ties, and consider brushed grommets to protect cables.

Call In The Pros

Paying a professional to plan a cabling layout before installation can prove beneficial. Viars says many speed issues are caused by poorly planned networks containing more terminations than necessary. She advises having a clear plan when implementing a new network. "If you're unsure of the best way to lay out your network, a professional can help you design and install it properly," she says.

Koty says a consultant or vendor's assistance with initial planning or layouts can result in a cabling plan that pays off for years. Smaller data centers, for example, "might not have the resources to print

professional labels," he says. "Tape and a Sharpie aren't the answer. This is a task sometimes best left to a professional."

Hodson says cable installation personnel are well-versed in OTDR meters and other cable testers. Having professionals check individual cable links from end to end to ensure traffic is within spec can be worthwhile rather than pulling in-house personnel away from tasks such as keeping operations running, he says.

Viars says crosstalk, bandwidth issues, hardware faults, and related areas can be difficult to identify without proper tools or experience. Hiring a technician with the right tools to identify speed issues might cost more upfront, but "your time might be better spent on other tasks, thus justifying the cost." ▣

Top Tips

✔ If a visual fault locator (VFL) doesn't identify a break in continuity, a technician with an optical time-domain reflectometer (OTDR) may be able to estimate fiber length and overall attenuation (including splice and mated connector losses) and help locate faults (such as breaks) and measure optical return loss.

✔ Create and maintain an alphanumerical grid system in raised floor areas so each tile has a unique address. Also maintain updated spreadsheets to identify cables, where they stem from and go, their colors, and specific configurations.

✔ Well-organized cabling systems result in quicker installation/patching of servers to switches and switches to devices/storage, easier troubleshooting of individual connections/links, secure cabling routing, and more uptime for mission-critical equipment.

Action Plan

■ Identify how widespread the cabling issue is.

■ Start troubleshooting at the jumper and then work backward.

■ Change the jumper.

■ If this fails, visually inspect the cabling for bends or kinks.

■ Use simple test equipment such as VFLs and power meters to identify potential problems.

■ If testing fails, perform advanced testing.

■ Call an expert if necessary.

Get Started

One item to keep on hand is a cable tracing tool, which is an easy, non-evasive way to save time and avoid risks related to pulling cables. A VFL and power meter can help identify various cabling issues and require little training to use. More comprehensive testers will enable testing network speeds and provide more detailed feedback concerning what faults exist and where, but depending on the size of the network and how often issues arise, they may not be worth the expense. Keeping extra patch cords, patch panels, and jacks can help prevent extensive downtime when simple issues occur. For problems outside your scope, know whom to contact for installation and maintenance issues.

HOW TO

Conduct A Successful BYOD Rollout

Processes That Can Pave The Way For A Smooth Implementation

BY NOW, most enterprises have come to terms with the fact their employees want to use their personal-owned devices for work-related tasks. Many enterprises have also realized there are numerous benefits to allowing this but also numerous issues they must address, including concerns related to security and the organization's data. Thus, it's vital for enterprises to incorporate and put in place a BYOD policy so everyone is on the same page. Here is some advice to help successfully roll out a BYOD program.

Enlist A Strategy

From the outset, it's imperative that enterprises have a clear and precise strategy for what they want to accomplish with their BYOD program and pinpoint exactly which employees the program will govern.

"The single biggest thing companies can do to help success along is to have a reasonable, concise, and predetermined policy which it formalizes and shares with all the constituents," says Jack Gold, founder and principal analyst of J. Gold Associates.

Gold says few companies have a strategy in place prior to adopting BYOD, noting that a recent survey conducted by his company showed that only about 29% of companies had such a strategy. Such strategies, he says, should take into consideration employees entitled to participate in BYOD, devices to include ("by type, as not all are created equal"), apps employees can access, the level of security/risk the company can live with, and the tools available to mitigate and manage BYOD.

Determine A Management Approach

Once an enterprise has addressed the employees, applications, use cases, and business processes its BYOD policy will include, Current Analysis principal analyst Kathryn Weldon says it must decide a management approach. This can include purchasing a mobile device management (MDM) software platform or service, a containerization platform, dual-persona solution, or an IT service provider or mobile operator's managed mobility service "that will ensure basic MDM features such as centralized configuration, remote lock and wipe, feature control, built-in VPN or on-device encryption, etc.," she says.

Of these options, Weldon says containerization and dual persona can provide

Key Points

- Having a reasonable, concise, and predetermined BYOD policy that your enterprise formalizes and shares with all end users is arguably the most important task you can do to ensure the success of a BYOD program or policy.

- Avoid developing a BYOD program/policy with the chief goal of containing costs.

- Determine how you'll manage your BYOD policy/program, whether that's choosing a mobile device management program, containerization, dual-persona, app-wrapping, or other approach.

the best management, "as they literally separate out the business apps and data that need to be protected. Antivirus and anti-malware solutions are also an extra precaution, but they may slow down the device and require an extra sign-on."

Another option is app-wrapping, which secures the application and data vs. securing the device so that regardless of the device in use, company data is protected. "App-wrapping may be part of a MAM [mobile application management] solution, which also provides an enterprise app store with a set of preauthorized applications for the individual employee or group that can be downloaded on a self-serve basis," Weldon says.

Whichever plan or platform/service your enterprise chooses, Weldon says, you need to develop an "acceptable use document that the end user signs, agreeing to follow certain rules and in many cases agreeing to have software installed on their device that may limit what they can access, what apps they can use, and may also monitor this usage."

Adapt To Your Business

In its "Getting Your Network Ready For BYOD" report, Gartner states that in today's environment, "many IT departments have little to no control over personally owned devices" while MDM and other solutions for controlling and securing devices are still maturing. Further, many networks lack the ability to enforce different access zones for personal and corporate-owned devices.

Thus, Gartner recommends that most organizations begin BYOD with a "Contain" strategy "in which personally owned devices are granted limited access to the network and to a subset of corporate applications." Once an organization gains an acceptable level of control over employee-owned devices, Gartner states, it can then shift to an "Embrace" strategy, granting devices full access to the network and corporate applications.

Actual implementation of a BYOD program can differ depending on a given enterprise. For example, Weldon says enterprises that must meet compliance requirements due to employees having access to confidential customer info (healthcare, financial services, and retail companies, for example), "need to be very

careful and are particularly good candidates to not only have MDM and security platforms but also to use a containerization solution."

For companies already using desktop virtualization solutions for notebooks, a more secure BYOD approach would be to extend the same common desktop image to the mobile device with "access to corporate apps via an SSL VPN with authentication required prior to access," Weldon says. Here, when an employee uses a device for her own consumer apps, browsing, photo-sharing, and similar activities, the VPN session isn't active. Corporate data, however, "stays in the data center and isn't even on the device; this is especially important to prevent breaches in the case of lost or stolen devices," Weldon says. ▣

Top Tips

✔ **Do the work up-front.** Companies that successfully roll out BYOD programs/ policies typically conduct a thorough analysis up-front with all constituencies, including human resources, IT, CIOs, and the head of information security, says Current Analysis principal analyst Kathryn Weldon. Most companies, however, "really don't have a comprehensive mobility policy worked out, let alone a mobile security policy, let alone a BYOD policy," she says.

✔ **Don't focus on cost containment.** Weldon says enterprises forging a BYOD plan with cost containment as the primary goal "are going to be disappointed." Beyond incurring more technical help desk calls, she says, "they are even more likely than before to have to get a good MDM/containerization solution. Prior to this, if they had, for example, only allowed and given out specific devices with the same OS from the same carrier, they wouldn't need a multi-carrier, multi-OS MDM system."

✔ **Address stipends and support.** Enterprises should be sure to check stipends for employees against actual usage "to make sure they really compensate the end user sufficiently," Weldon says. Also spell out support and maintenance details in the acceptable use document the company creates. Generally, she says, fixing and buying new devices is left up to end users.

✔ **Be proactive.** Jack Gold, founder and principal analyst of J. Gold Associates, says rather than end users driving IT, IT should be proactive and not reactive where BYOD is concerned. Enterprises also need to avoid underestimating "the degree of difficulty BYOD brings to do right, costs, and especially support costs (and resources)."

Action Plan

■ Enlist input up-front from all concerned parties concerning devices, data, access, costs, security, and other key factors.

■ Decide who can participate in the BYOD program.

■ Determine which applications, usage cases, business processes, and other elements you'll allow.

■ Develop a strategy for managing devices such as mobile device management, containerization, or app-wrapping.

■ Create an acceptable use document that employees must sign and agree to abide by.

■ Develop a reimbursement plan that covers stipends for devices, usage, maintenance, and other similar issues.

Get Started

Kathryn Weldon, principal analyst at Current Analysis, says the aim of incorporating a BYOD program isn't just for cost benefits but also providing employee satisfaction, enabling greater productivity, and enhancing hiring and retention. Companies should attempt to determine all costs in advance, factoring in that they might save money on the device but need to spend extra on IT support and purchasing a mobile device management, security, containerization, dual persona, or desktop virtualization solution. Post-implementation, plan to monitor the program (including via feedback) for successes and failures in an attempt to keep TCO low and potentially increase ROI.

BUYING TIPS:

Data Center Cooling

DATA CENTERS run more efficiently and reliably with the proper temperature, and uptime is everything. Having the right equipment is essential. Here are things to keep in mind as you're looking for the best cooling system for your data center.

✔ Plan, Plan, Plan

"Probably the most frequent mistake made by owners purchasing equipment is not knowing the load. In some cases they overestimate the load, requiring too much cooling equipment, which causes cost and operational problems. On the other side of the spectrum, underestimating load results in hot spots or worse," says John W. Martin, marketing manager at Data Aire (800/347-2473; www.dataaire.com). Get a qualified mechanical engineer with data center experience involved early in the process to ensure you get the size and type of equipment to meet your requirements, he says.

Gina Dickson, director of infrastructure products at Black Box (877/877-2269; www.blackbox.com), says you need a strategy. "Establish a cooling methodology for your data center. Raised floor or no raised floor? Hot aisle/cold aisle? Containment? Perimeter cooling or localized cooling? A combination of methods?"

Along with that, you need to understand the total investment and what you need for the cooling equipment. "For example," Dickson says, "liquid cooling using chilled water is extremely efficient, but if you do not have access to a chiller or a budget to purchase one, this is not a good option."

Dickson says you'll also need to know what type of maintenance is required for the equipment, what warranty comes with the equipment, and whether you can purchase a service agreement.

✔ Ensure The Unit Can Keep Up With Demand

Make sure the unit you want is designed for 24/7 cooling and can maintain the temperature you require, says Mike Paulson, president of AmeriCool (800/680-0725; www.americoolinc.com). Particularly with portable air conditioners, he says, a common mistake is purchasing a unit that is not designed for commercial applications and environments. "With most data center managers wanting their rooms kept at 68 degrees, it is important to find a unit that will cool below 68 degrees and run 24/7," he says.

Dickson says the cooling equipment needs to be able to scale. "Think about not only what is in the room now, but what you plan to add or think you might add over the next three to five years . . . You don't want to have to do a total rebuild or buy a new CRAC/H unit," she says.

✔ Decide Between Portable & Permanent

Weigh the pros and cons of portable and permanent air-conditioning systems, says Clark Michel, vice president of Atlas Sales & Rentals (800/972-6600; www.atlassales.com). "The installed cost of a portable cooler can be dramatically lower," he says, as a permanent system often entails at least some construction and installation costs. Plus, maintenance is also simpler with portable systems.

When purchasing a portable unit, Michel says, consult with your equipment supplier to make sure you get a unit that will handle the total heat load. "It is actually not a bad idea to oversize portable equipment slightly."

✔ Don't Forget About Airflow

"A great deal of money is thrown away on cold air that just doesn't reach the equipment," says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

Data Aire's Martin agrees, adding, "The most important issue in data center cooling is airflow management, starting with hot aisle/cold aisle, blanking panels, and sufficient room under the floor to allow for air distribution." If you can add filler panels and other add-ons to your cabinets and racks, then you can direct cool air to where it's needed." P

BUYERS' CHECKLIST

✔ How many BTUs do you need to keep your equipment at the appropriate temperature?

✔ Do you really need the additional cooling equipment?

✔ Do you need a closed- or open-loop system?

✔ Where will the cooling equipment be located?

✔ How much of a concern is noise output?

KEY TERMS

British Thermal Units (BTUs)
Used to measure the amount of energy required to heat a liquid such as water. A single BTU represents enough energy to raise the temperature of one pound of water by one degree Fahrenheit at a constant pressure of one atmosphere. In the context of cooling equipment, BTUs are listed as a given rating per hour.

cooling capacity factor (CCF)
The ratio of total installed nameplate capacity to critical load. This ratio should be about 1.2, or 120%.

power usage effectiveness (PUE)
A technique used to help enterprises measure how much of their total data center energy usage is going toward IT and computing equipment.

BUYING TIPS:

Tablets & Smartphones

GONE ARE THE DAYS when pundits questioned whether smartphones and tablets had a place in the enterprise. Desktops and laptops are crucial, but with a tablet and a smartphone, you can conduct business on the go and stay connected to your co-workers and clients.

The key is to find the perfect combination of carrier, operating system, hardware, apps, and other features that fit exactly what your enterprise and employees need to be successful and productive.

✔ Assess The Need

Before you even start looking at which tablet or smartphone to purchase, make sure your workforce will actually use them. Letting employees bring in their own devices is one thing, but choosing to issue these mobile devices or fully support them should be a needs-based decision.

✔ Form A Strategy

Determining which device can best meet users' requirements is arguably the most important consideration.

"Enterprises should ask themselves, 'Can my employees do everything they need to on these devices,'" says Christian Kane, Forrester Research analyst.

Jack Gold, analyst at J. Gold Associates, says many companies know they have to deploy and support tablets and other mobile devices "because the boss says so," but "they really don't have a strategic plan in place. That's really what's lacking for most companies." Rather than looking at the smartphone, tablet, or other device first, he says, look at the application you want to deploy on it, what you want that app to do, and if you'll build or buy the app. Then decide what device best fits the model.

✔ Pick The Tablet Based On Your Environment

As tablets continue to get more similar in terms of features and functionality, it may seem like any tablet will work for your employees. But even though manufacturers are closing the gap on each other, there are still quite a few things to consider when comparing tablets.

For instance, if users are going to be consuming considerable content, it may be helpful to invest in tablets with larger screens. If employees will be using tablets to create content, a keyboard attachment can make productivity faster and easier. But you also may need something that is flexible enough for both uses, so you don't end up with a device-segmented workplace.

✔ Compare The Applications

A device's OS determines what types of built-in software and apps are compatible with the device. All mobile OSes have at least some business features, so it depends on which OS supports the apps and services you want to use as well as the devices you want to implement

Depending on the OS, the device may have a number of preinstalled programs, including calendars, email clients, Web browsers, and more. You should try to match your enterprise's existing infrastructure to your device's supported apps.

✔ Ensure The Device Is Protected

When shopping for mobile devices, search for onboard security features and available apps that can add an extra layer of security. Some features may include password protection, which will lock your phone or tablet if someone fails to enter the correct password after a certain number of tries. Another feature to look for is the ability to remotely wipe your device if it is lost or stolen. Cases and screen protectors are important for protecting your device's outer shell and its inner components. ▣

BUYERS' CHECKLIST

✔ **Aim for company-wide compatibility.** If you can supply the same tablet to every user, it will help your IT team be able to secure and manage the devices and easily make updates or wholesale changes if necessary.

✔ **Consult end users.** Jack Gold, analyst at J. Gold Associates, says while users' desires shouldn't be the overwhelming driving force in a decision, the user experience and apps they'll use should be.

✔ **Keep an open mind.** Don't just automatically pick a certain product because it's from your favorite manufacturer or eliminate one because it's not. Pick the product that's best for your business.

KEY TERMS

BYOD
A policy in which enterprise employees are allowed to bring their own devices (tablets, smartphones, notebooks, etc.) from home and connect them to the corporate network. Such policies present network and security issues that need to be planned for.

carrier network
The underlying infrastructure belonging to a telecommunications company offering voice or data services. Carriers may appear to be similar, but each carrier will offer different network features.

form factor
The overall design of a tablet, smartphone, or other device. Includes elements such as size and shape.

BUYING TIPS:

Servers

BUYING A NEW SERVER takes significant prep work. Beyond pinpointing the data center's needs and how the server will meet them, there are budgetary, compatibility, and vendor considerations to address, as well. Because servers are so essential for businesses, IT managers must understand when it's time to buy new servers, and as with any IT purchase, the goal should always be to invest in a solution that will give the company the performance it needs for years to come.

✔ Determine The Features That Are Most Important
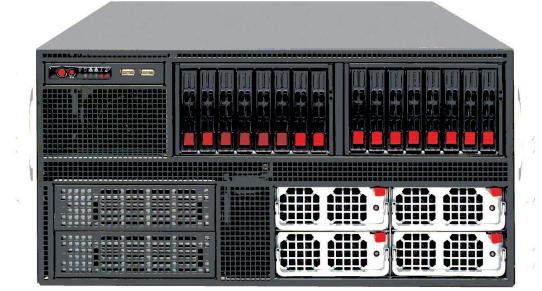
Charles King, president and principal analyst at Pund-IT, counts CPUs, memory, and I/O as the most critical server features, though their relative importance depends on the application and workload they'll support. Companies running a business-critical database or online transaction program, for example, should eye a higher-end CPU/system than what's needed for general-purpose applications. For virtualization-related use, spend more for extra memory and I/O.

Mark Bowker, Enterprise Strategy Group senior analyst, says that too often, IT purchases a server with more capacity than needed, which provides the comfort of extra headroom but also incurs additional expense. At the same time, though, you want to future-proof your investment as much as possible by looking for efficient, power-saving servers that can help lower energy costs in the short and long term.

"IT should understand what the latest processor chipset is on the market and what the stated road map of the chip manufacturers are," Bowker says. "This will help avoid buying into servers that are at the end of a product life cycle."

Tau Leng, Ph.D., vice president and general manager of corporate marketing and HPC solutions at Supermicro (408/503-8000; www.supermicro.com), adds that today's server systems are available with a variety of processor technologies and form factors. "Customers often purchase equipment that is overdesigned with unnecessary features," he says, which is why it's essential you work with an experienced and reliable partner that can offer a variety of solutions.

In addition, Leng says, adherence to standard rack unit is important to allow for easy interchange of servers. Remote management features also are critical, and power savings is becoming an important element in TCO determinations.

✔ Watch For Trends

Leng says one relatively new trend in servers is high-temperature free-air-cooled server environments, which can reduce electricity demand and rein in costs.

Virtualization and consolidation are also having an impact. John Sloan, lead analyst for virtualization and consolidation at Info-Tech Research Group, says it's important to know how a server will fit into a consolidated stack that includes servers, networks, and storage.

Unlike distributed models, Sloan says, "in a consolidated infrastructure, the server is a unit of hard capacity (processing and memory) that's combined with networks and storage in a resource pool that's partitioned up into virtual entities." Increasingly, he says, enterprises aren't buying servers, but blocks of capacity. What differentiates current offerings "is how the interconnects are managed and how the whole thing is managed as one resource pool," Sloan says. Typically, blade servers are the form factor for consolidated offerings, he says.

✔ Consider Your Budget & The Total Cost Of Ownership

Before you get started with a server upgrade or replacement, be sure to carefully plan your budget. Don't forget that the total cost of ownership includes many different items beyond just the upfront server cost. Possible expenditures include those related to equipment, software licensing, labor, telco and power company services, facility improvements, vendor support, and downtime. Additional costs related to supporting a new platform can include those for power, network cabling, cooling, rack space, and management personnel, he says.

"In any infrastructure purchase, the upfront capital acquisition cost is just part of the deal. Three- to five-year total costs should be calculated, including maintenance and facilities costs," Sloan says. ▣

BUYERS' CHECKLIST

✔ Match the application and workload the server will support to the CPU, memory, I/O, storage, and other components it will require.

✔ Recognize that virtualization, consolidation, and cloud computing are trending areas where servers are concerned.

✔ Ensure the vendor satisfies all questions concerning support, compatibility, performance, and other issues.

KEY TERMS

80 Plus
A certification program that measures power supply efficiency.

form factor
The space a server occupies. Examples include 1U, 2U, 3U, 4U, 5U, 7U, and blade.

Intelligent Platform Management Interface (IPMI)
Technology for remotely monitoring and managing servers.

BUYING TIPS:

Flooring & Accessories

YOUR DATA CENTER'S FLOORING can be just as important as the servers and other equipment it holds. Choosing the right flooring provides a stable, efficiently cooled data center. Here's what to look for.

✔ Know The Weight

Raised floor tiles come in different weight capacities, so consider your weight-bearing requirements when selecting tiles, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). The final floor has to be strong enough to support your equipment at the height of the raised floor. Also be aware of rolling load and use heavy-duty floor tiles where you will be moving equipment into and out of the data center.

Remember as rack sizes grow and densities increase, your floor tiles may need to support a greater weight than you have today. Plan ahead and install floor tiles to meet current and future needs, Koty says.

✔ Check The Finish & Material

Be careful when selecting the floor finish, Koty says. "You don't want to be constantly replacing tiles in high-traffic areas to keep the floor looking uniform."

Avoid floor tiles wrapped in galvanized metal, Koty says, as the galvanized-wrapped tiles could cause zinc whiskers over time. If you are using cement-filled tiles, use a sealant to coat any cut edges of your tiles.

You'll also need to consider static dissipation and material weight, says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "Data center flooring needs to have a surface that is conducive of static dissipation," she says, to prevent the build-up of static electricity. In addition, she says, "lightweight solutions, as well as 'lay-down' panels rather than bolt-down ones, can make maintenance or swaps significantly easier."

✔ Be Aware Of Cooling & Floor Height

If you can maximize the available space under the floor, you can increase your data center's overall cooling efficiency. As for the height of the floor, there are some general standards to follow, Koty says:

- 12 inches for less than 1,000 square feet
- 12 to 18 inches for 1,000 to 5,000 square feet
- 24 to 36 inches for 5,000 or more square feet

Koty says if you want your new flooring to accommodate a hot/cold aisle configuration, make sure to plan your under-floor cable layout according to CRAC and PDU/RPP unit locations.

✔ Check Vendor Experience

If your company doesn't have anyone on staff with experience in data center flooring, don't hesitate to rely on the expertise of a vendor. It can help you choose the right flooring and prevent the need for a potentially costly flooring replacement down the road.

✔ Opt For Accessories

You may be tempted to cut corners to save money, but don't, Viars says. "Don't compromise on the integrity of your flooring. Make sure floor panels fit together as intended (even if it requires custom cutting/sizing), and spring for the additional airflow management accessories. It might cost a bit more upfront, but it will ensure that your cooling remains effective."

Koty says if you are planning a new raised floor construction job or a build-out, plan ahead and install brushed floor grommets as the floor tiles are being installed. "If you wait to install the grommets at the time the equipment is installed, you have fewer grommet options, plus there is the added risk of introducing contaminants into the data center."

BUYERS' CHECKLIST

✔ Do the flooring panels fit your needs and allow for effective cable management?

✔ Is there enough open space under the floor for cable routing and cooling?

✔ Does your vendor have a stellar reputation and testimonials from past clients?

✔ Are all sections of the data center flooring capable of handling the weight and traffic to which they will be subjected?

KEY TERMS

bypass airflow
Conditioned air that does not reach computer equipment. Unintended bypass airflow can occur by escaping through cable cut-outs, holes under cabinets, misplaced perforated tiles, or holes in perimeter walls.

concentrated load rating (also referred to as static load)
Rating specified in pounds of force applied over a one-square-inch area.

directional airflow
Airflow panels such as perfs and grates that deliver air directly to the face of the rack.

panel
The material that makes up the walking surface of a raised floor. Depending on your weight and traffic needs, the panel may be made from steel, concrete with steel reinforcing bars, or aluminum.

rolling load
Dynamic (varying) loads usually created by moving equipment on casters over the raised floor.

BUYING TIPS:

Equipment Recycling & Disposal Services

WHEN YOU'RE DEALING with old equipment, you typically have two options: reuse it in another capacity, such as repurposing an old server for an application that doesn't demand mission-critical performance, or use a vendor that specializes in refurbishing, recycling, and disposing of old equipment.

A vendor can ensure equipment is handled in an environmentally responsible manner while abiding by privacy and compliancy regulations. Here's what to look for.

✔ Compare Providers

Steven Freedman, president of FMI Recycling (214/747-6525; www.fmi recycling.com), says there are two common options: in-house demanufacturing, which is best for high-grade materials, and equipment shredding, which is best for low-grade materials.

When comparing service providers, examine what the services are offering, says Brett Femrite, director of business development for Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

"Some of the larger companies charge for asset disposal, while others will pay you for the equipment. Smaller regional companies can often provide more cost-effective solutions because of local transportation, labor, and processing," he says. Companies that offer to pay you may provide revenue sharing and the ability to purchase other refurbished hardware. "Ask for referrals, performance reports, or projections up front. Looking at past disposal lists will make it easy to forecast what you can expect," Femrite says.

Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com) says you want a reputable company with a good track record. Find out how long the vendor has been in business and ask for (and check) a list of previous clients.

✔ Know Your Equipment & Needs

Be sure you understand your equipment and the capabilities of the recycling company, Koty says.

"Can your equipment be recycled whole, or must it or parts of it be destroyed? How are you going to handle hard drives or other media devices? Are you going to remove them yourselves and destroy them prior to recycling, or is the service qualified to destroy them for you?," Koty says. Be sure any servers you are disposing of have all your data removed, Koty says, and consider pulling and destroying the data drives prior to recycling the rest of the equipment.

"If you have specific needs for the way equipment is destroyed, ask for a certificate of destruction as verification of the service provided."

✔ Check Facilities, Processes

Don't automatically look for the least expensive company, Koty says. "Even if the outside firm produces all the proper paperwork and has a good sales pitch, there could still be liability issues for the data center if the firm doesn't follow proper disposal procedures," Koty says.

He recommends visiting the firm and inspecting its procedures. Check what security and surveillance the vendor uses, how it can assist with ROI for current projects, and what documentation processes it uses.

Freedman says you need to make sure the recycling company securely handles and processes material. "Do they monitor destruction and wiping of material? Do they process material in-house? Is the company credible? Is the company certified?"

Find out how equipment is picked up and handled, who pays for shipping, where equipment ends up, when you will get paid, and if the vendor can assist in other ways such as providing new products or offering credit from old equipment. Know if the vendor has downstream vendors and who they are.

✔ Onsite Or Offsite Destruction?

With data destruction, you have two choices: onsite or offsite. With an onsite service, you won't have to deal with chain of custody documentation. If your data center stores a lot of sensitive data and wants to physically destroy the data, you'll have peace of mind from watching the destruction take place.

If you want absolute destruction that's beyond recovery, offsite data destruction may be ideal as service providers typically have more powerful shredders at their facilities than mobile shredder services can offer, plus a number of offsite data destruction services also double as a reprocessing center that can remarket the parts, so you can get some return value for your used equipment. P

KEY TERMS

certificate of destruction
When a recycling company issues a COD, it assumes responsibility for the equipment and certifies the material was processed or destroyed. This releases the customer from all liabilities.

data wiping
A process used for compliance and privacy reasons in which data is entirely destroyed or erased from equipment such as hard drives.

BUYERS' CHECKLIST

✔ **Homework.** Compile a list of equipment you no longer need, then determine its resale value, what businesses might purchase the equipment, and how the resale value can help fund new purchases.

✔ **Qualifications.** Determine how long the prospective vendor has been in business, what its reputation is in the industry, and what compliancy and certification measures it operates by and has achieved.

✔ **Broker or provider.** Determine if the vendor actually provides recycling and disposal services or is just a broker of such services.

✔ **Process.** Clarify the methods the vendor uses to process equipment, including who handles equipment, where it goes, how long processing takes, and what documentation you can expect.

BUYING TIPS:

UPSes

IF A POWER OUTAGE OCCURS and a data center doesn't have UPSes that can meet the necessary power requirements, the result will be potentially business-crippling downtime. Here's what to keep in mind as you're comparing available options.

✔ Learn Your Total Load & Maximum Runtime

"You have to start with some basics and be armed with some knowledge before making a selection," says Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

"You'll need to know the voltage of the electrical service that will power the UPS," Femrite says.

In addition, know the minimum time UPS batteries must provide power and the maximum runtime needed. Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says if you have diesel generators, typically 15 minutes of battery backup time is standard.

"You have to decide what your uptime goals are," Koty says. "If all you're looking for is enough power to allow a safe shutdown, simple inexpensive UPS systems may work out just fine. For mission-critical facilities where uptime is paramount, a parallel system utilizing redundant systems, dual bus, or a combination of both may be required."

✔ Know The Features & Options

The UPS features your enterprise needs can depend greatly on the protection level required for given applications. To start with, you need to determine an appropriate UPS configuration, Koty says.

"What type of system will work best at your facility: static or rotary?" With a rotary system that has centrifugal ride-through, Koty says, you will not have to purchase batteries. But with a small window of ride-through time, the diesel generators must start or your data center will go down. "You have no time to react if diesel generators fail to start or utility power cannot be restored," he says.

"If you have dirty power, you'll want a UPS system that can handle more than just a straight power loss," Koty says. Make sure your UPS can handle power anomalies such as spikes, surges, swells, or sags as well as it handles a straight loss of power.

You also need to check the efficiency rating of the system, Koty says. Because it most likely will be running 24x7, a system with low efficiency can add up in operating costs over time.

Femrite agrees and adds that, although it's desirable to have a UPS with a high efficiency rating, external bypass switches that enable power to bypass the UPS for maintenance purposes, monitoring capabilities (local and remote), warranties (system, batteries, etc.), and high-performance filtering, "they may not all be needed or cost-effective."

✔ Plan For The Future

Koty says a common mistake is not planning for future electrical needs. "Make sure the system you buy can either handle the needs of the data center as it will be built out, or make sure that it is modular in design so that, as electrical needs increase, additional UPS units can be installed/integrated without disrupting the existing systems." If you're buying a modular system, make sure to size the input feeds to your system to accommodate the maximum upgrade size, he says.

When planning for future growth, don't forget to account for unexpected additions that inevitably crop up. But perhaps most important, purchase the right-sized UPS for your needs today. "Too small of a UPS system may need to be replaced as power consumption increases or risk failure; too large of a system is inefficient," Koty says.

✔ Check For Support & Service

As you're narrowing your UPS choices, compare vendor service and maintenance. Koty says to check what local representation the UPS company has in your area. "Typically you will want a maintenance contract that will guarantee a 30-minute callback and no longer than four hours to have a person onsite." P

BUYERS' CHECKLIST

✔ Determine your power and protection requirements.

✔ Ensure the UPS can handle the required loads.

✔ Make certain the UPS provides sufficient runtime and capacity.

✔ Determine warranty, insurance, and guarantee requirements.

✔ Plan for future needs and requirements and be sure to account for unexpected additions.

KEY TERMS

line-interactive
A UPS with built-in line-sensing abilities to regulate high- and low-voltage levels; an inverter activates when power loss occurs and the system switches to battery power.
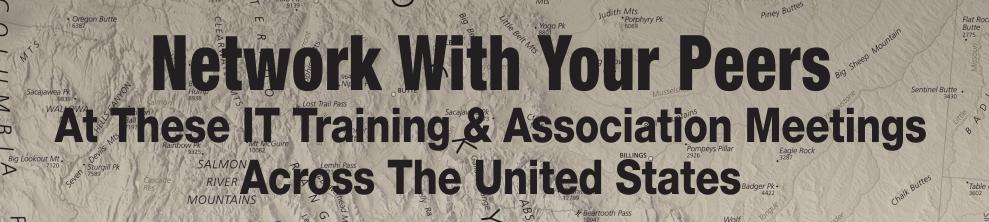
online
A UPS type providing the highest protection level; the inverter is online and operates constantly to eliminate incoming surges and low- and high-voltage issues while delivering clean power.

standby
A UPS type that runs power through surge suppression to connected equipment; after a power outage, the UPS switches to battery backup power, reverting to AC power when power returns.

PROCESSOR.

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At These IT Training & Association Meetings
Across The United States

AUGUST

SharePoint TechCon
Aug. 11-14

Boston, Mass.

www.bigdatatechcon.com

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Implementing
Cisco IOS Network Security
Aug. 12-16

New Horizons Washington, D.C.

1331 F St. N.W., Suite 240

Washington, D.C.

www.dcnewhorizons.com

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AITP Richmond
Aug. 13

Hilton Garden Inn at Innsbrook

4050 Cox Road

Glen Allen, Va.

www.aitprich.org

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AITP Wheeling
Aug. 14

White Palace at Wheeling Park

1801 National Road

Wheeling, W.Va.

www.aitp-wheeling.org

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AITP Twin City
Aug. 15, 7 p.m.

Ozark House Restaurant

704 McGregor St.

Bloomington, Ill.

www.aitp.org/members/group_content_view
.asp?group=75779&id=125369

AITP
Southwest Missouri
Aug. 20

High Street Baptist Church

900 N. Eastgate Ave.

Springfield, Mo.

aitpspringfield.org/main.html

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Cisco CCN Certification
Training Course
Aug. 21

Institute of Professional Learning

500 W. Cypress Creek Road

Ft. Lauderdale, Fla.

www.iplearning.net

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ISSA Inland Empire
Aug. 27, 11:30 a.m. to 1:30 p.m.

Upland, Calif.

ie.issa.org

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ISSA Baltimore
Aug. 28

Concurrent Technologies Corp.

8530 Corridor Road

Savage, Md.

www.issa-balt.org

SEPTEMBER

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Sept. 10

Hilton Garden Inn at Innsbrook

4050 Cox Road

Glen Allen, Va.

www.aitprich.org

AITP Wheeling
Sept. 11

White Palace at Wheeling Park

1801 National Road

Wheeling, W.Va.

www.aitp-wheeling.org

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AFCOM Potomac
Sept. 12

Augustine Golf Club

76 Monument Drive

Stafford, Va.

www.afcom.com

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AITP Washington, D.C.
Sept. 12
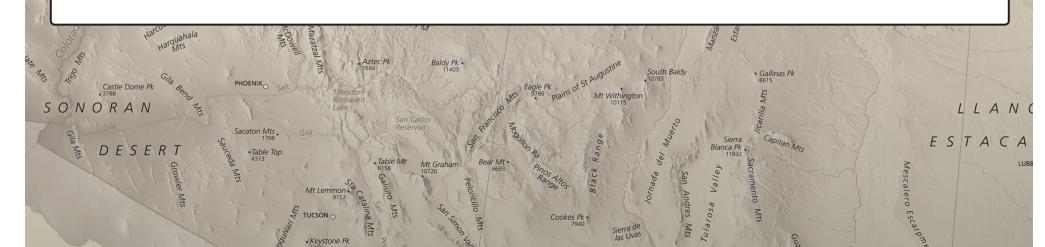
Alfio's La Trattorio Restaurant

4515 Willard Ave.

Chevy Chase, Md.

www.aitpdc.org

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BICSI
Fall Conference
Sept. 15-19
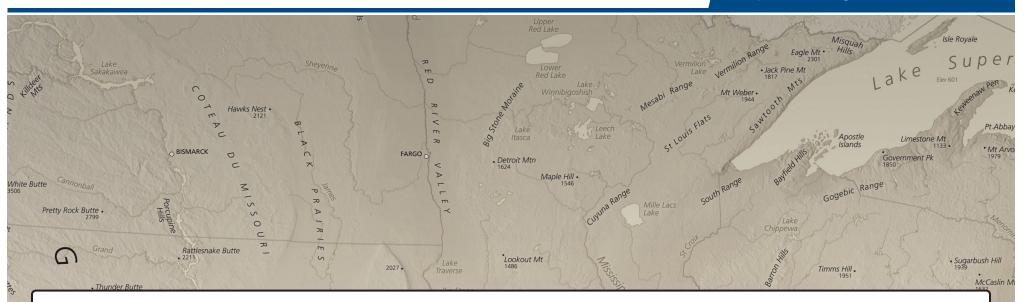
MGM Grand Hotel

3799 Las Vegas Blvd.

Las Vegas, Nev.

www.bicsi.org

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CompTIA
Network Certification
Sept. 16

New Horizons Lexington

1050 Chinoe Road, Suite 208

Lexington, Ky.

www.nhlexington.com

Upcoming IT Events

AFCOM Greater
Tampa Bay Chapter

Sept. 18, 12:30 to 4 p.m.

www.tampabayafcom.com

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AITP
Northeastern Wisconsin

Sept. 18

Holiday Inn Appleton

105 S. Nicolet Road

Appleton, Wis.

new.aitp.org/eventsmeeting-info

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AITP
Twin City

Sept. 19, 7 p.m.

Ozark House Restaurant

704 McGregor St.

Bloomington, Ill.

www.aitp.org/members/group_content_view
.asp?group=75779&id=125369

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Cisco CCNP
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Institute of Professional Learning

500 W. Cypress Creek Road

Ft. Lauderdale, Fla.

www.iplearning.net

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AITP
Akron

Sept. 24

Akron, Ohio

www.akron-aitp.org

ISSA Inland Empire

Sept. 24, 6:30 to 8:30 p.m.

Upland, Calif.

ie.issa.org

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AITP
California Southland

Sept. 25

Garden Grove, Calif.

www.aitpcalsouthland.org

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ISSA Baltimore

Sept. 25

Concurrent Technologies Corp.

8530 Corridor Road

Savage, Md.

www.issa-balt.org

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Data Center World

Sept. 29-Oct. 2

Orlando World Center Marriott

Orlando, Fla.

www.datacenterworld.com

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Deploying Windows Server 2008

Sept. 30

New Horizons Tysons Corner

2010 Corporate Ridge, Suite 200

McLean, Va.

www.dcnewhorizons.com

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Interop

Sept. 30-Oct. 4

Javits Center

New York, N.Y.

www.interop.com

OCTOBER

AITP Wheeling

Oct. 9

White Palace at Wheeling Park

1801 National Road

Wheeling, W.Va.

www.aitp-wheeling.org

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AITP Fall Region 5 Conference

Oct. 10 (Early bird registration ends Aug. 31)

The Chateau

1601 Jumer Drive

Bloomington, Ill.

www.aitp.org/group/905

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AITP Region 5
Leadership Workshop

Oct. 11 (Early bird registration ends Aug. 31)

The Chateau

1601 Jumer Drive

Bloomington, Ill.

www.aitp.org/group/905

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AITP Washington, D.C.

Oct. 10

Alfio's La Trattorio Restaurant

4515 Willard Ave.

Chevy Chase, Md.

www.aitpdc.org

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AITP Richmond

Oct. 15

Hilton Garden Inn at Innsbrook; 4050 Cox Road

Glen Allen, Va.

www.aitprich.org

**Do you have an event you'd like to see listed?
Send an email to feedback@processor.com.**

Processor Solutions Directory

Here are brief snapshots of several companies offering products designed for the data center and IT industry. Listings are sorted by category, making it easy for you to find and compare companies offering the products and services you need.

You can find more detailed information on these companies and the products they offer inside this issue.

To list your company and products, call (800) 247-4880.

PHYSICAL INFRASTRUCTURE

LINDY — CONNECTION PERFECTION

LINDY USA specializes in cables, adapters, electronics and accessories for computer, networking and audio video applications. Since 1932 Lindy has supplied high quality interconnects to customers in commercial, telecom and residential markets. What sets us apart is our complete dedication to innovation, performance and reliability. Our cabling products are truly outstanding.

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(800) 555-7176 | Cablesys.com/pro

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Products Sold:

• Power control, distribution, management, and metering
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(800) 523-2702 | www.baytech.net

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Rack Solutions

RackSolutions has been serving the data center market for more than 10 years. All of our products are designed, engineered, built, and shipped under our own roof. We have product solutions available for every major OEM, but if one of our existing products doesn't fit your needs, our top-notch mechanical and electrical engineers can create the item you need from scratch, solving even the toughest installation design challenges. Best of all, we typically don't charge up-front fees for design services.

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Products Sold:

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• End-to-end copper and fiber cabling	

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• Enclosures	• Curtains

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• Cool
• Monitor
• Manage

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• Ceiling Mounted Units	• Heat Exchangers
• Rack and Row Solutions	• System Controls

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Server Technology — Quality Rack Power Solutions

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Text retrieval products, including:

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- Network with Spider
- Publish (for portable media)
- Web with Spider
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FMI Recycling

FMI Recycling has been a leader in environmental responsibility for more than 28 years. They specialize in recycling end-of-life products, electronic equipment, scrap metals, and all types of industrial equipment. They pride themselves on their tradition of excellent customer service, knowledge and expertise, logistics capabilities, and community involvement and support.

We Process and Buy:

- Computers, Hard Drives, Memory, Laptops, IC's, Chips Boards, Cellular Phone, Telephones, Cables, Accessories
- Main Frames, Printers, Drives, Telecom, Manufacturing, all types of scrap metal

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